Risk Assessment of Bear – Human Interaction at Campsites on the Tatshenshini River and Lower Alsek River, Yukon, B.C., and Alaska

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SUMMARY

Campsites along the Tatshenshini River and lower Alsek River from Shaw'ashe/Dalton Post, Yukon to Dry Bay, Alaska were evaluated for their potential for bear – human interaction, including displacement of bears from feeding areas and direct bear – human encounters.

Several qualitative indicators were used at campsites to estimate the potential for bear – human interaction including an evaluation of 1) seasonal habitat potential, including the presence and relative abundance of bear foods, 2) bear travel concerns, such as terrain features that might force a bear to travel through a campsite, and 3) visibility and other sensory concerns, that is, the ability of bears and people to detect each other.

Thirty-nine campsites and two trails were identified, assessed, and rated. A number of specific management recommendations were made concerning campsite use, and some general management strategies were suggested to help reduce the potential for bear – human interaction and conflict on the Tatshenshini River and Alsek River.

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1.0 INTRODUCTION

Tatshenshini-Alsek Park, B.C., Kluane National Park and Reserve, Yukon, Wrangell St. Elias National Park and Preserve, Alaska, and Glacier Bay National Park and Preserve, Alaska together form one of the largest protected area complexes in the world (Liddle 1994). Glaciers or non-vegetated mountain massifs cover a large portion of this protected area and are unused or unavailable to bears. Only 18% of Kluane National Park are vegetated (Grey 1987 in Hegmann 1995) and glaciers cover approximately 50% of the Haines Triangle (Lofroth and Mahon 1993). The Tatshenshini River and Alsek River valleys represent a large proportion of available bear habitat within the parks through which they flow, consequently, their importance to bears is high (Fuhr and Edie 1990, Simpson 1992, Herrero *et al.* 1993). Minimizing human induced displacement and mortality of bears along these rivers will be important to the long-term conservation of bears.

The Tatshenshini River and Alsek River are similar to many rivers in western North America in that seasonally important habitat for grizzly bears (*Ursus arctos*) and black bears (*Ursus americanus*) are on valley bottoms near riparian areas. Humans also use these habitats for recreation and travel. This habitat use overlap creates the potential for indirect and direct bear – human conflict. Indirect conflict includes the exclusion of bears from important habitat and the alteration of habitat. Direct conflicts are negative bear – human interactions that may result in the destruction or translocation of bears or human injury and property damage.

Recent increases in the popularity of the Tatshenshini River and Alsek River as wilderness river destinations coincided with world-wide publicity generated to protect the Tatshenshini River from mining development in the early 1990's. Both rivers have become internationally renowned among river recreationists (Askey and Williams 1992, Dill *et al.* 1997) and since 1989 recreation on both rivers has increased substantially (Askey and Williams 1992, Hegmann 1995). Grizzly bear research in Kluane National Park has found that the river travel season of humans coincides with the seasonal movement of grizzly bears to low elevations (McCann 1998). This overlap in use of the major river valleys presents considerable potential for bear – human interaction and conflict (McCann 1994). McCann (1994) recognized the need for information on campsite use by both humans and grizzly bears and recommended that campsite use be evaluated. Subsequently, in 1996 a risk assessment of bear – human interaction at campsites was done along the upper Alsek River from Serpentine Creek on the Dezadeash River to Lowell Lake (Wellwood 1997, Wellwood and MacHutchon 1999a). In 1998 and 1999, risk assessments were completed for the rest of the Alsek River in Kluane National Park (Wellwood and MacHutchon 1999a, c) and for the B.C. portion of the Alsek River in Tatshenshini-Alsek Park (Wellwood and MacHutchon 1999b).

This project was initiated to do a campsite risk assessment for the Tatshenshini River and lower Alsek River from Shaw'ashe/Dalton Post, Yukon to Dry Bay, Alaska. It is a collaborative project among the agencies responsible for managing visitor use of these two rivers, including

BC Parks, the U.S. National Parks Service, Parks Canada, and the Yukon Department of Renewable Resources. This project completes campsite risk assessments for both the Tatshenshini River and Alsek River and the work benefited considerably from the earlier work of Wellwood and MacHutchon (1999a, b, c) along the Alsek River.

The objectives of the bear – human interaction risk assessment along the Tatshenshini River and lower Alsek River were to:

1. Qualitatively assess and rate the potential for displacement of bears from habitats at and adjacent to campsites;
2. Qualitatively assess and rate the potential for bear – human encounters at campsites; and
3. Make management recommendations to reduce the potential for bear – human interactions at campsites.

2.0 BACKGROUND

2.1 Bear – Human Interaction

The following definitions apply to terms used in this report for bear and human interactions, encounters, or incidents. **Bear – human interaction** is any of the various activities and their effects involving bears and humans, including sightings, encounters, and incidents. A **sighting** or **observation** is when a human sees a bear but the bear appears to be unaware of the human. An **encounter** is when a bear is aware of human presence, regardless of whether the humans are aware of the bear or not. During encounters, bears can be displaced, they may ignore people because they are human-habituated, or they may approach people. **Displacement** refers to encounters where the bear is displaced and runs or walks away. An **incident** or **conflict** is the most serious bear – human interaction. An interaction is considered an incident when there is a charge by a bear toward people, people have to take extreme evasive action in response to a bear, people have to use a deterrent on a bear, there is damage or loss of property or food, or a bear makes physical contact with a person.

The individual response of bears to humans can vary and depends on the experience, age, sex and reproductive status of the bear. The past experience of bears with people can have a major effect on the future response of bears to people and generally falls into three reinforcement categories: negative, neutral or positive (McCullough 1982, Gilbert 1989). Bears will avoid areas near people after being harassed, hurt, or injured and past negative experiences with people can make bears wary of humans. Cubs may learn to fear people by observing their mother's behaviour (McCullough 1982, Gilbert 1989, Herrero 1989). However, newly weaned immature bears usually undergo a curious or testing phase in their life during which they try to figure out on their own how to relate to other bears and people, irrespective of lessons they learned from their mother. During this time, they may investigate and interact with humans and their property regardless of what their mother's attitude toward people was. Wariness likely involves both genetic inheritance and learning, however, past experience is probably the most important factor in a long-lived, rapidly learning animal like a bear (McCullough 1982).

Neutral interactions with people can lead to human-habituation. Human-habituation has been defined as a reduction in the frequency of a response when no consequence is perceived by a bear (McCullough 1982, Gilbert 1989). Avoidance or fear responses fade when a threat, pain or injury (i.e., punishment) does not follow the stimulus causing the response.

Positive reinforcement for bears around people usually involves the acquisition of human food or garbage. Poor management of human food and garbage can lead to food-conditioned bears. Food-conditioning by bears occurs when bears have fed on human food or garbage and bears learn to associate humans and/or human development with potential sources of food (Gilbert 1989). Food-conditioned bears have low survival under many circumstances. They are predisposed to nuisance activity, the garbage they eat may compromise their health, and they become dangerous and unpredictable. As a result, they are frequently killed in defence-of-life or property, killed in control actions or they are translocated. It is important to make the distinction between human-habituated bears and food-conditioned bears. A food reward or food conditioning is not necessary for habituation to occur (McCullough 1982, Gilbert 1989). Situations that can lead to food-conditioning have to be strictly controlled (McCullough 1982; Gilbert 1989; Herrero 1985, 1989). Even a low rate of exposure to human food or garbage will reinforce problem behaviour in bears (McCullough 1982). Safe human activity around bears is very difficult where bears associate people with food rewards. In areas where bears become attracted to human food sources, mortality increases significantly because of control kills and kills in defence of life or property (BC Environment 1996).

Overall, bears are tolerant of humans and the likelihood of being injured by a bear is low (Herrero 1985, Herrero and Fleck 1990). The main situations leading to human injury by bears are 1) when food conditioned bears, that are also human-habituated, aggressively approach people for food, and 2) when humans suddenly surprise a bear at close range, particularly a female grizzly bear with cubs. Habituated bears that are not food-conditioned are not usually a risk to humans if people behave in a predictable manner and bears do not learn to associate humans with food or garbage. In the Yellowstone ecosystem prior to 1970, food-conditioned bears were responsible for most injuries to humans. Yellowstone National Park significantly reduced conflicts with bears through proper bear proofing of food and storage of garbage. In recent years, habituated bears foraging for natural foods near areas of human use have been responsible for most bear – human conflicts, but the rate of injury is much lower than it was in the past (Gunther 1994).

Grizzly bears can be displaced from areas of human activity, but the degree of displacement depends on the type of human activity, the amount of security cover, an individual bear's past experience with humans, and the relative quality of resources around the area of human activity (McLellan 1990). Grizzly bears that are wary of humans undergo stress, and make temporal or spatial adjustments in their activity patterns in areas of human use (Warner 1987, Gilbert 1989, Gunther 1990, Olson and Gilbert 1994). They may stop using feeding sites near human activity if interruptions are frequent (Gunther 1990). Human-habituation can reduce the time and energy

costs associated with a fear response to people (McCullough 1982, Herrero 1989, McLellan and Shackleton 1989, Gunther 1990).

Adult male bears are typically not as energetically stressed and have greater social dominance than other bears. Thus, adult males frequently use higher quality foraging habitats that are farther from humans. Black bears, less dominant sub-adult male grizzly bears and adult female grizzly bears, who require more energy for gestation or lactation, are more likely to use natural habitats near humans and are therefore more susceptible to habituation or food-conditioning in interactions with humans. Security conscious females with cubs of the year may be displaced into lower quality habitats by both adult male bears and humans (Mattson 1990). Habitat displacement can lead to use of sub-optimal habitats, which may affect the net energy available for growth and reproduction.

Habitat type and quality plays an important role in the number of bear – human interactions (Holcroft 1986, Ciarniello 1996). Densities of bears are generally higher in better quality habitats and some of these habitats are also well used by humans for recreation. As a result, people active in these habitats are more likely to encounter or displace bears. In Denali National Park "...interactions occurred on river and gravel bars more frequently and on tundra less frequently than expected by occurrences of the habitats within the park" (Albert and Bowyer 1991). Albert and Bowyer (1991) recommend that the use of campgrounds in riparian habitats be restricted in seasons of high bear use and that human activities in good grizzly bear habitat be reduced to reduce bear – human interactions.

3.0 STUDY AREA

The Tatshenshini River flows approximately south from Shaw'ashe/Dalton Post, Yukon through the southwest Yukon and touches on Kluane National Park before entering Tatshenshini-Alsek Park in B.C. (Figure 1). It flows south within Tatshenshini-Alsek Park before turning west and then joining the Alsek River upstream of the B.C. and Alaska border. In Alaska, the lower Alsek River flows west and south and west again before it empties into the Gulf of Alaska downstream of Dry Bay, Alaska. Maximum flows, charged by glacial runoff, are in June and July and minimum flows are in late August and September (Peepre and Associates 1992). Shoreline features include alluvial fans and river bars that are commonly used for camping. Alluvial benches with steep cut banks, colluvial slopes and inaccessible channels are present in some locations and restrict shoreline use.

There is a transition from a dry, cold, continental interior climate to a wet, warmer, maritime climate along the Tatshenshini River and Alsek River. The rugged St. Elias Mountains form a barrier to storms from the Gulf of Alaska and create a rain shadow effect on the leeward side of the mountains (Peepre and Associates 1992). The rivers transect the mountain barrier allowing warm, wet coastal conditions to penetrate farther into the continental interior.

In Haines Junction, Yukon the mean annual temperature is -3.2°C and the mean annual rainfall is 293 mm. In Yakutat, Alaska, the mean annual temperature is 4°C and mean annual precipitation is 3429 mm (Geddes Resources Limited 1990). Strong winds are common on the lower Tatshenshini and Alsek rivers. These winds develop from storms originating in the Gulf of Alaska (Wahl *et al.* 1987 in Peepre and Associates 1992). Localised topography and cold air drainage from glaciers also influence the direction and intensity of winds (Peepre and Associates 1992). Winds frequently blow glacial silt and sand high into the air and dust storms are common in some locations, particularly at the Tatshenshini River and Alsek River confluence.

Douglas (1974) described 20 major vegetation communities that occur on the upper Alsek River. Forest communities are dominated by white spruce (*Picea glauca*), balsam poplar (*Populus balsamifera*), trembling aspen (*Populus tremuloides*), or willow (*Salix scouleriana)*. Pioneer or seral type shrub and herb communities occur on soils including aeolian and lacustrine deposits, glacial till and gravel outwash fans. Common shrubs and herbs include willows (*Salix* spp.), soapberry (*Shepherdia canadensis*), kinnikinnick (*Arctostaphylos uva-ursi),* horsetail (*Equisetum arvense*), sage (*Artemisia* spp.), field locoweed (*Oxytropis campestris*), bear root (*Hedysarum alpinum*), northern sweet-vetch (*Hedysarum boreale* spp. *mackenzii*), and yellow mountain-avens (*Dryas drummondii*).

Less is know about the vegetation communities of the Tatshenshini River and lower Alsek River. No detailed vegetation surveys have been done, although several reconnaissance studies have been done in the Haines Triangle area, concentrating primarily on the Tatshenshini River. These brief studies included wildlife habitat (Simpson 1992), grizzly bear habitat (Fuhr and Edie 1990, Herrero *et al.* 1993), and vegetation (Yang and Graham 1994). Increasing coastal influence is evident in the vegetation along the lower Tatshenshini River and lower Alsek River. White spruce disappears and vast slopes of thick alder (*Alnus crispa*) become common. Lush forb meadows, many dominated by fireweed (*Epilobium angustifolium*), become increasingly prevalent on the side slopes. Hydrophilic plants such as devil's club (*Oplopanax horridus*) and cow parsnip (*Heracleum lanatum*) also become common. Other plant species that begin to appear include clasping twisted stalk (*Streptopus amplexifolius*), salmonberry (*Rubus spectabilis*), strawberry (*Fragaria* spp.), and goat's beard (*Aruncus dioicus*). Plant species that seem to disappear include soapberry, kinnikinnick, red-osier dogwood (*Cornus stolonifera*), and highbush-cranberry (*Viburnum edule*).

Grizzly bears and black bears are common along the Tatshenshini River and Alsek River. A rare bluish colour phase of the black bear has been documented on the Alsek River below the confluence with the Tatshenshini River (Herrero *et al.* 1993). Other carnivores include, lynx (*Lynx lynx*), wolverine (*Gulo gulo*), wolf (*Canis lupus*), and red fox (*Vulpes vulpes*). Ungulates include moose (*Alces alces*) and Dall's sheep (*Ovis dalli*). Small mammals include, arctic ground squirrel (*Spermophilus parryii*), snowshoe hare (*Lepus americanus*), porcupine (*Erethizon dorsatum*), and other species of small rodents (Peepre and Associates 1992, Lofroth and Mahon 1993).

4.0 METHODS

4.1 General Bear Ecology

I reviewed available literature pertaining to bear ecology along the Tatshenshini River and Alsek River or in ecologically similar areas. From this, I compiled a list of bear foods for interior, coast – interior, and coastal ecological zones of the North. Short-term studies of grizzly bears have been done in the Haines Triangle area (Simpson 1992, Herrero *et al.* 1993) and longer-term studies have been done in Kluane National Park (Pearson 1975, McCann 1998). Black bear food habit information primarily came from MacHutchon (1989) and MacHutchon and Smith (1990). In addition, MacHutchon and Himmer (1997) and MacHutchon (1998a) compiled lists of foods used by bears in similar coastal and coast – interior ecological zones of northern B.C. Plant occurrences in the Tatshenshini River and lower Alsek River were assessed in the field to produce a list of possible bear foods for the two rivers. Some information on the diet of bears in the two valleys was also obtained from scat examination and feeding sign in the field.

4.2 Campsite Assessment

I identified campsites that were known to the B.C. Parks Ranger, Glacier Bay National Park Rangers, Kluane National Park Wardens, and river guides by conducting interviews. Identified campsites and previously unknown campsites were located in the field using the methods of Dill *et al.* (1997). I looked for areas that had the following features:

- a shoreline with slow moving water or a back-eddy for safe boat moorage,
- reasonable access from the river,
- a reasonable distance from the shoreline to the site,
- clear and flat areas for tents, and
- wind and weather protection, clear water, and firewood.

An area was confirmed as a campsite if it had been previously identified as a campsite, it had disturbed vegetation, surface litter, and/or soils, or it had unnaturally arranged rocks or logs and/or fire scars. Campsites were considered to be 'frequent use' or 'low use' based on the methods of Jackson and Wright (1998) and MacDougall *et al.* (1998). A 'frequent use' campsite met one or more of the following criteria:

- campsite use statistics collected by Glacier Bay National Park Rangers indicated frequent use,
- it had been identified as frequently used during interviews,
- it had unnaturally arranged rocks or logs,
- it had a fire scar(s),
- it had human-caused loss of vegetation or compacted soil, or
- it had human-made trails.

A 'low use' campsite met all of the following criteria:

- the only evidence of use was a fire scar or unnatural arrangement of rocks,
- the campsite had not been identified as frequently used, and

- it had few desirable features, such as wind or weather protection, clear water, or firewood.

All identified campsites were evaluated qualitatively by wildlife biologists Grant MacHutchon and Stefan Himmer for the potential for bear – human interaction. Assessments were done within an approximately 250-m radius of campsites. Site descriptions were completed before risk ratings were assigned. A freehand sketch of the campsite and surrounding area indicated the relative position of habitat types, trails, mark trees, and prominent geographic features. Photographs were taken of the campsite and representative habitats. The Universal Transverse Mercator (UTM) co-ordinates of campsites were determined using a Trimble Geographic Positioning System (GPS). We also described and rated the following for each campsite:

Seasonal Habitat Potential – The potential use of the area by bears based on the availability (i.e., distribution and abundance) of food plants and the possible availability of animal foods such as salmon or salmon carcasses. We did a broad vegetation description and rated the general availability of individual bear foods as high (H), moderate to high (M-H), moderate (M), low to moderate (L-M), or low (L). We then rated the seasonal habitat potential for feeding as high, moderate to high, moderate, low to moderate, or low for spring (mid-May to mid-June), summer (mid-June to mid-July), and late summer (mid-July to late September).

Bear Travel Concerns – Travel concerns included features that would influence the likelihood of a bear travelling through a campsite or surrounding area. These were geographic features such as valley junctions and constrictions in terrain, including rock outcrops, cliffs, cut banks, steep slopes, moraines, islands, and peninsulas. The location and proximity of wildlife trails and potential travel routes were recorded. Bear travel concerns were rated as high, moderate, or low.

Visibility & Other Sensory Concerns – Visibility and other sensory concerns were features that would reduce the ability of bears and humans to detect each other. Visibility concerns were features such as vegetation and topography that limited visibility thus increasing the potential for surprise encounters. Other sensory concerns were wind and noise from rivers and creeks which would affect the ability of bears and humans to hear each other. Visibility concerns and other sensory concerns were rated as high, moderate, or low.

Bear Sign – All fresh and old bear sign were recorded as evidence of use. Sign included tracks, scats, feeding, trails (minor or major), mark trails, mark trees, and beds. Some types of bear sign were more obvious then others. For example, tracks were more obvious at campsites that had sand or mud than at campsites with harder substrates. Some beaches retained tracks longer than others because of less frequent flooding and some campsites had features that made trails more obvious than at others. Campsites were only examined during the late summer season consequently we did not assume that little recent bear sign indicated that the campsite had little use by bears. Because of the inequities in the ability to detect bear sign, it had a lesser

influence on the overall risk ratings than the factors described above. Bear sign was recorded but not rated.

Following our evaluations, we collectively rated each campsite, relative to other campsites, for both the potential for displacement of bears and the potential for bear – human encounter. Each was rated as high (H), moderate to high (M-H), moderate (M), low to moderate (L-M), or low (L) and integrated all the factors evaluated above.

5.0 RESULTS AND DISCUSSION

5.1 General Bear Ecology

5.1.1 Movement

Bears have the ability to travel almost anywhere they choose, however, they typically use the easiest route that also provides feeding opportunities. This is typically along valley bottom creeks and rivers and over drainage divides (MacHutchon 1996). The spring movement of adult male bears is less predictable because they move widely when they are seeking breeding opportunities. There are some physical barriers, primarily high mountains, which limit the easy movement of bears between the Tatshenshini River and the Alsek River. In the fall, bears likely concentrate their activity near prime fishing or scavenging areas. If salmon fishing areas are not available, then bears may move up and down the river searching for carcasses. Bears will often walk gravel bars looking for salmon.

5.1.2 Food Habits

There are a variety of foods available to bears in each of their seasons of activity, i.e., spring (mid-May to mid-June), summer (mid-June to mid-July), and late summer (mid-July to mid-September). I compiled a list of documented and potential bear foods for the Tatshenshini River and Alsek River based on a literature review as well as scat analysis and feeding sign seen in the field (Table 1).

The actual identity of foods eaten will vary with a bear's location in the valley and the distribution and abundance of the food. Our ratings of the relative abundance of bear food plants at campsites along the Tatshenshini River and lower Alsek River provides some measure of the relative distribution of these plants along the two rivers (Appendix 1). Field locoweed was common on alluvial fans that were dominated by mountain-avens (*Dryas* spp.) and these areas were often used as campsites. Field locoweed was evident along the entire length of the two rivers. Soapberry was common and widely distributed along the edges of treed areas or amongst other shrubs, particularly along the Tatshenshini River. Soapberry was not seen at any campsites from Walker Glacier downstream.

Table 1. Documented and potential bear foods along the Tatshenshini River and Alsek River. Each food type was classified as a major, minor, or possible bear food for three seasons.

		Season[a]		
Common Name	Scientific Name	Spring	Summer	Late Summer
ROOTS				
*bear root, alpine sweet-vetch	*Hedysarum alpinum*	major	minor	major
cow parsnip	*Heracleum lanatum*	possible	possible	possible
*field locoweed	*Oxytropis campestris*	minor	possible	minor
*lupine	*Lupinus* spp.	minor		minor
northern sweet-vetch	*Hedysarum boreale* spp. *mackenzii*	minor	minor	minor
sweet-cicely	*Osmorhiza* spp.	possible	minor	minor
***GRAMINOIDS**				
sedges	*Carex* spp.	minor	minor	minor
grasses	Graminae	minor	minor	minor
HORSETAIL				
*common horsetail	*Equisetum arvense*	major	major	major
*horsetail	*Equisetum spp.*	major	major	major
FORB & SHRUB STEMS, LEAVES, or FLOWERS:				
balsam poplar	*Populus balsamifera*	minor	minor	
*cow-parsnip	*Heracleum lanatum*	minor	major	major
devil's club	*Oplopanax horridus*	major	major	major
*field locoweed	*Oxytropis campestris*	major	major	minor
fireweed	*Epilobium angustifolium*	minor	minor	
*northern ground-cone	*Boschniakia rossica*	minor	major	major
lady fern	*Athyrium filix-femina*	minor	minor	
other locoweed	*Oxytropis* spp.	possible	possible	
mountain sorrel	*Oxyria digyna*	minor	minor	
Pacific hemlock-parsley	*Conioselinum pacificum*	possible	possible	
purple-leaved willowherb	*Epilobium ciliatum*	possible	possible	
salmonberry	*Rubus spectabilis*	minor	minor	
stinging nettle	*Urtica dioica*	minor	minor	
willow catkins	*Salix* spp.	minor	minor	possible
FRUITS				
baneberry	*Actaea rubra*		possible	possible
clasping twisted stalk	*Streptopus amplexifolius*		minor	minor
*currant	*Ribes* spp.		minor	minor
*devil's club	*Oplopanax horridus*	possible	minor	major
highbush-cranberry	*Viburnum edule*	minor	minor	major
*kinnikinnick	*Arctostaphylos uva-ursi*	major	minor	minor
mountain-ash	*Sorbus* spp.		minor	minor
red bearberry	*Arctostaphylos rubra*	minor	minor	minor
red currant	*Ribes triste*		minor	minor
red elderberry	*Sambucus racemosa*	minor	minor	minor
red raspberry	*Rubus* spp.		minor	minor
red-osier dogwood	*Cornus stolonifera*		minor	minor
prickly rose	*Rosa acicularis*		minor	minor
*salmonberry	*Rubus spectabilis*		minor	minor

Common Name	Scientific Name	Season[a]		
		Spring	Summer	Late Summer
saskatoon	*Amelanchier alnifolia*		minor	minor
*soapberry, soopolallie	*Shepherdia canadensis*		minor	major
stink currant	*Ribes bracteosum*		possible	possible
strawberry	*Fragaria* sp.		minor	minor
ANIMAL				
salmon	*Oncorhynchus* spp.		minor	major
*ants	Formicidae	major	major	minor
microtines		minor	minor	minor
*arctic ground squirrel	*Spermophilus parryii*	major	major	major
moose	*Alces alces*	major	major	major

[a] Spring = mid-May to mid-June, summer = mid-June to mid-July, and late summer = mid-July to late September.

* Known bear food along the Tatshenshini River and Alsek River from this project and Wellwood and MacHutchon (1999b)

Kinnikinnick occurred in similar areas as soapberry and had a similar distribution along the two rivers. It seemed to disappear about the same place as soapberry. Bear root was not that common along the Tatshenshini River, but became much more common along the lower Alsek River, particularly south of the Novatak Glacier. Field locoweed, soapberry, and kinnikinnick were most abundant in early succession habitats and many campsites were also in these habitats, such as river bars and alluvial fans. As a result, many campsites had potential feeding areas in or adjacent to them. Horsetail was most common in wet depressions and on slopes and was most common at sites along the Tatshenshini River. Highbush-cranberry appeared to be most abundant in mid-Tatshenshini River to the Netland Glacier on the Alsek River, but was seen again at Dry Bay. Several food plant species, such as cow parsnip, devil's club, and salmonberry, increased in relative abundance in more coastal influenced portions of the lower Tatshenshini River and lower Alsek River. Some food plant species appeared to be relatively common within the river valleys, but were not that common around campsites, including stinging nettle (*Urtica dioica*), sweet-cicely (*Osmorhiza* spp.), lady fern (*Athyrium filix-femina*), red elderberry (*Sambucus racemosa*), red-osier dogwood, and red currant (*Ribes triste*). These plants were most common in herb meadows and on wet mountain slopes, which were also densely vegetated with alder and devil's club.

Fuhr and Edie (1990) and Simpson (1992) reported observing areas where bears had dug extensively for the roots of Indian pipe (*Monotropa uniflora*) on the Alsek and Tatshenshini rivers. We did not observe Indian pipe anywhere that we travelled. We first started seeing evidence of digging for another saprophyte, northern ground-cone (*Boschniakia rossica*), on the lower Tatshenshini River (at Melt Creek) and since it was an unknown food to us prior to that we did not start recording its relative abundance until then. We found frequent evidence of it in scats after this point and saw additional evidence of digging by bears. Simpson (1992) reported areas where bears had dug for field locoweed and sweet-cicely roots. We did not see evidence of digging for sweet-cicely roots, but we also did not encounter it very often.

However, we did see evidence of digging for field locoweed roots along the lower Tatshenshini River (also around Melt Creek) and downstream of there. We found several grizzly bear digs of lupine, likely Nootka lupine (*Lupinus nootkatensis*), beside the airstrip at Dry Bay.

5.1.3 Habitat Use

The following is a probable habitat use scenario for bears along the lower Tatshenshini River and is adapted from Simpson (1992). In spring, bears likely use south facing slopes that have early green-up of herbaceous vegetation such as graminoids, horsetail, and cow parsnip. Bears may also search for ground squirrels in areas where digging is easy. Our observations of bear digs for ground squirrels were relatively uncommon along the Tatshenshini River and Alsek River, however I suspect bears actively pursue ground squirrels in areas away from the river where they are more common. In addition to south-facing slopes, other important spring feeding habitats for bears likely include habitats with bear root, wet herbaceous meadows, seepage's with horsetail, and areas with over-wintered kinnikinnick berries. In summer, bears likely use habitats with cooler aspects and habitat use is likely dispersed throughout the valley. Important habitats along the river are mountain-avens benches with field locoweed, wet herbaceous meadows, and seepage's with horsetail. As berries ripen in late summer, bears will likely primarily feed on devil's club, soapberry, and highbush-cranberry. Habitats with these berry species can be common at or adjacent to the rivers.

There was high quality habitat for bears all along the Tatshenshini River and Alsek River and the rivers appeared to be major travel routes for bears. Bears likely feed and travel along the Tatshenshini River in all seasons, but habitat use by bears may not be as concentrated along the river as it appeared to be along the upper Alsek River in Kluane National Park (Wellwood and MacHutchon 1999a). This is largely because the valley bottom of the Tatshenshini River is much wider in places and, therefore, bears have more habitat choices.

5.2 Campsite Assessments

Campsites between Shaw'ashe/Dalton Post, Yukon and Dry Bay, Alaska along the Tatshenshini River and lower Alsek River were evaluated during a rafting trip between July 30 and August 11, 1999. Thirty-nine campsites and two trails were identified (Table 2; Figures 2-4) and all sites were assessed and rated for their potential for bear – human interaction (Table 3). Four of the sites on the lower Alsek River had previously been evaluated (Wellwood and MacHutchon 1999b). Our specific observations during the campsite assessments, including seasonal habitat potential, bear travel concerns, visibility concerns, other sensory concerns, bear animal foods, and bear sign are in Appendix 2.

With the exception of the trail to the grass knoll at Sediments Creek and the numerous trails to Walker Glacier, our assessments did not include potential hikes that people may make away from campsites. If people hike away from campsites they will increase their risk of encountering or displacing a bear.

Table 2. The location of campsites evaluated along the Tatshenshini River and lower Alsek River, Yukon, B.C., and Alaska.

Site #[a]	Location Description	Side of River	UTM[b] Zone	UTM[b] (NAD 27) Easting	UTM[b] (NAD 27) Northing	UTM (NAD 83) Easting	UTM (NAD 83) Northing
TY01	Upstream put-in at Shaw'ashe/Dalton Post	RR	8v	386420	6666332	386301	6666513
TY02	Above Village Creek but below major bend; cobble bar	RL	8v	385183	6666684	385064	6666866
TY03	Squaw Creek mouth	RL	8v	379529	6657156	379410	6657337
TY04	Upstream side of Silver Creek	RR	8v	378046	6656476	377927	6656657
TK05	Downstream side of Silver Creek	RR	8v	378000	6656385	377881	6656566
TK06 a	Upstream side of Bridge Creek	RR	8v	376538	6654123	376419	6654304
TK06 b	Downstream side of Bridge Creek	RR	8v	376500[c]	6653975[c]	376381	6654156
TT07	2-3 km upstream of Quiet Canyon below Bridge R.	RR	8v	376689	6651220	376570	6651401
TT08	Cliff between Quiet Canyon and Detour Ck.	RL	8v	374319	6644154	374200	6644335
TT09	Across from Detour Ck. at back channel outlet	RL	8v	372908[d]	6640534[d]	372789	6640715
TT10	Upstream side of "Bear Bite" Creek	RR	8v	372770	6633566	372651	6633747
TT11	Upstream side of Sediments Creek	RR	8v	372311	6630257	372193	6630438
TT12	Downstream side of Sediments Creek outlet	RR	8v	372241	6630224	372122	6630405
TT13	Upstream side of Alkie Creek mouth	RR	8v	375589	6619373	375470	6619554
TT14	Downstream side of O'Connor River	RL	8v	376234	6612174	376115	6612355
TT15	Across from Henshi Ck.; bay between two rock points	RL	8v	368982	6604222	368863	6604403
TT16	2-3 km down from Henshi Creek at cliff face	RR	8v	365874	6602976	365755	6603157
TT17	Downstream side of Tats Creek	RR	8v	363582	6599294	363463	6599475
TT18	Downstream side of Towagh Creek	RL	8v	361920	6595356	361801	6595537
TT19	Large gravel bar upstream of Ninetyeighter Creek	RL	8v	351719	6593299	351600	6593480
TT20	Mouth of Ninetyeighter Creek	RL	8v	349136	6594193	349018	6594374
TT21	Upstream side of Melt Creek	RL	8v	346677	6594179	346558	6594360
TT22	Downstream side of Melt Creek	RL	8v	345896	6594599	345777	6594780
TT23	Petroglyph Island/ Tatshenshini Island	Mid	8v	345446	6595857	345327	6596039
AT110*	Downstream side of Reynolds Glacier Creek	RR	8v	338600[c]	6595950[c]	338481	6596131
AT111*	Netland Glacier view; rock outcrop	RR	8v	337350[c]	6595800[c]	337231	6595981
AT112*	Island campsite #1	RR	8v	335500[c]	6595250[c]	335381	6595431
AT113*	Island campsite #2	RR	8v	335400[c]	6595400[c]	335281	6595581
AT114	Across from Reynolds Glacier mouth	RL	8v	340122	6594568	340003	6594749
AG201	Several km upstream of corner above Walker Glacier	RL	7v	669218[d]	6591376[d]	669089	6591546
AG202a-c	Walker Glacier, sub-sites a - c	RL	7v	666980[f]	6588234[f]	666850	6588404
AG202d	Below lake at Walker Glacier; sub-site of AG202	RL	7v	666158	6587368	666029	6587538
AG203	Below waves upstream of Novatak Gl. ("Purple Haze"?)	RR	7v	655559	6583824	655430	6583994
AG204	200 m up of Novatak Gl. Mouth ("Purple Haze"#2?)	RR	7v	654562	6583023	654432	6583193
AG205	Alsek Lake spit; upstream site	RL	7v				
AG206 a&b	Alsek Lake spit, sub-sites a & b	RL	7v	660154[g]	6566366[g]	660025	6566536
AG207	Gateway Knob	RR	7v	661470[d]	6563922[d]	661341	6564092
AG208	Across from Gateway Knob; edge of lake near mouth	RR	7v	660514	6563333	660385	6563503
AG209	Alsek Lake dunes area near outlet of lake	RL	7v	660067	6561558	659938	6561728
AG210	Island on lower Alsek above Dry Bay pullout	Mid	7v	649174	6563692	649045	6563862
AG211	Dry Bay pullout campsite and airstrip	RL	7v	643453	6560876	643324	6561046

[a] TY = Tatshenshini River, Yukon; TK = Tatshenshini River, Kluane National Park and Reserve; TT = Tatshenshini River, Tatshenshini-Alsek Park; AT = Alsek River, Tatshenshini-Alsek Park; AG = Alsek River, Glacier Bay National Park and Preserve.

[b] Unless otherwise noted, locations are 3D from a Trimble Scoutmaster GPS.

[c] Location from a 1:50,000 map.

[d] 2D location from a Trimble Scoutmaster GPS.
[e] Campsites evaluated in 1998 (see Wellwood and MacHutchon 1999b).
[f] Location of sub-site "a" for AG202.
[g] Location of sub-site "a" for AG206.

Table 3. Ratings for bear travel concerns, visibility concerns, other sensory concerns, seasonal habitat potential, and the seasonal potential for displacing or encountering bears at campsites along the Tatshenshini River and lower Alsek River. L = Low, L-M = Low to Moderate, M = Moderate, M-H = Moderate to High and H = High.

Site	Bear Travel	Visibility	Other Sensory	Habitat Potential			Bear – Human Interaction Risk					
							Spring[c]		Summer[c]		Late Summer[c]	
#[a]	Concern	Concern	Concern	Sp	Su	LSu	Displ.	Enc.	Displ.	Enc.	Displ.	Enc.
TY01	H	H	L	L-M	M-H	H	L	L-M	M	**M-H**	**M-H**	**H**
TY02	M	L	L	L-M	L	M	L-M	L	L	L-M	M	M
TY03	M	M	M	L	L-M	H	L	L	L-M	M	**M-H**	**M-H**
TY04	L	M	L	L	L	H	L	L-M	L	L-M	**M-H**	**M-H**
TK05	M	L	L	L	L	M-H	L	L-M	L	L-M	M	M
TK06 a	M	H	M	H	M	M-H	L-M	M	L-M	M	M	M
TK06 b	M	L	M	L	L	M	L	L	L	L	L-M	L-M
TT07	L	M	L	H	M-H	M	M	M	M	M	L-M	M
TT08	M	L	L	M-H	M-H	M	M	L-M	M	L-M	M	L-M
TT09	L	L	L	M	M	L-M	L-M	L	L-M	L	L	L
TT10	M	M	M	M-H	M-H	M	L-M	L-M	L-M	L-M	L	L
Trail-TT11	H	H	M	H	H	H	**H**	**M-H**	**M-H**	**H**	**M-H**	**H**
TT11	M	L	M	L	M-H	M-H	L	L-M	M	L	M	M
TT12	M	H	M	L-M	L-M	H	L-M	M	L-M	M	H	H
TT13	L	M	M	L	L	L	L	L-M	L	L-M	L	L
TT14	H	H	M	M-H	M-H	M	**M-H**	**M-H**	M	**M-H**	M	**M-H**
TT15	H	H	H	M-H	H	H	M	**M-H**	**M-H**	**H**	**M-H**	**H**
TT16	M	M	M	M-H	M-H	L-M	M	M	M	M	L-M	L-M
TT17	H	H	H	L-M	M	M	M	**H**	M	**H**	M	**H**
TT18	M	M	M	M-H	H	H	M	M	**M-H**	**H**	**M-H**	**M-H**
TT19	M	M	H	L	L	L	L	L-M	L	L-M	L	L-M
TT20	H	M	M	M	H	M-H	L-M	M	M	**M-H**	M	**M-H**
TT21	H	M	M	L	H	M-H	L	M	**M-H**	**H**	M	**H**
TT22	M	H	L	L	H	M	L	L-M	**M-H**	**M-H**	M	M
TT23	M	L	M	L-M	L-M	H	L	L-M	L	L-M	L-M	L-M
AT110[b]	M	M	M	L	L-M	M	L	L-M	L	L-M	L-M	M
AT111[b]	H	M	M	L-M	M	H	L	M	M	M	M	**M-H**
AT112[b]	L	L	M	L	L-M	L-M	L	L	L	L-M	L	L-M
AT113[b]	L	L	M	L	M	M	L	L	L	L-M	L	L-M
AT114	M	M	M	L	M-H	M-H	L	L-M	M	M	M	M
AG201	M	M	M	L-M	H	M-H	L-M	M	**M-H**	**M-H**	M	**M-H**
AG202 a-c	M	M	M	L-M	H	M-H	L	L-M	M	M	M	M
AG202 d	M	M	M	L	L	L	L-M	M	L-M	M	L-M	M
AG203	L	M	M	L	L	L	L	L-M	L	L-M	L	L-M
AG204	L	L	M	L	L	L	L	L	L	L	L	L
AG205	M	M	M	H	M	M-H	**M-H**	**M-H**	M	M	**M-H**	**M-H**
AG206 a&b	H	M	M	H	M	M-H	**M-H**	**M-H**	M	M	**M-H**	**M-H**
AG207	L	L	L	L-M	M	M-H	L	L	L-M	L-M	M	L-M
AG208	L	L	L	H	L-M	M	M	M	L	L	L-M	L-M
AG209	M	L	L	L-M	M	L	L	L-M	L-M	L-M	L	L
AG210	L	M	M	L	L-M	L	L	L	L	L-M	L	L
AG211	L	L	M	M	M	M	L	L-M	L	L-M	L	L-M

[a] TY = Tatshenshini River, Yukon; TK = Tatshenshini River, Kluane National Park and Reserve; TT = Tatshenshini River, Tatshenshini-Alsek Park; AT = Alsek River, Tatshenshini-Alsek Park; AG = Alsek River, Glacier Bay National Park and Preserve.

[b] Campsites evaluated in 1998 (see Wellwood and MacHutchon 1999b).

[c] Spring = mid-May to mid-June, Summer = mid-June to mid-July, and Late Summer = mid-July to late September.

5.3 Recommendations for Campsite Use

Objective

Reduce the risk of bear – human interaction at or near campsites, including the displacement of bears from feeding areas and direct bear – human encounters.

Background

The major difficulty in recommending management strategies for campsite use along the Tatshenshini River and Alsek River is that there are no established bear management or human management objectives. One of the important short-term tasks of the management agencies should be to co-operatively develop a bear management plan or strategy that outlines these objectives (see section 6.1). In the absence of such a plan for the Tatshenshini River and Alsek River, I have made recommendations on campsite use with an emphasis on bear conservation at the potential cost to visitor freedom of choice.

River travellers generally chose campsites that had a convenient pullout (e.g., a bay or back-eddy), flat areas in close proximity to the river for tents, shelter from the wind, clear water, and firewood. It appears that concerns about the potential for encountering or displacing bears were rarely considered in the choice of campsites. As a result, I believe that management agencies will need to consider controlling human use of campsites along the rivers to try and minimize the potential for negative bear – human interaction. Managers of some recreational areas have addressed concerns about potential bear – human interaction by locating campsites and trails away from bear habitats. However, bears use the entire Tatshenshini River and Alsek River, so people can not camp along the rivers without being in close proximity to bears and their habitat. All campsites we evaluated have the potential for bear – human encounters and use of these campsites may displace some bears. Nevertheless, some campsites or sub-sites of larger campsites appeared to have lower potential for bear – human interaction than others. Table 4 outlines specific recommendations for the 39 campsites and 2 trails that we evaluated.

General Recommendations

1. Encourage use of the recommended campsites in Table 4 and discourage use of those that are considered of moderate or higher risk of bear – human interaction. Twelve (31%) of the 39 campsites that were assessed were recommended and an additional 12 (31%) had suggested restrictions if they continue to be used. Fifteen (38%) sites were not recommended for camping.
2. If people are allowed to camp at the 12 sites with moderate or higher risks for which I have suggested additional restrictions, then they should be warned of the potential risks of using these sites.
3. All river travellers should be encouraged to closely follow safety in bear country principles when at campsites, such as camping in groups of 6 or more people, maximizing their visibility and their ability to see bears, avoiding wandering away from the campsite, bear-

proofing their food and garbage, and making noise when in areas of low visibility or when approaching the toilet.

Table 4. Management recommendations for campsites evaluated along the Tatshenshini River and lower Alsek River, Yukon, B.C., and Alaska.

Site #[a]	Location Description	Recommendation(s)
TY01	Upstream put-in at Shaw'ashe/Dalton Post	Not recommended for camping. High risk of encountering bears and moderate to high risk of displacing bears in late summer. Should be used as a launch area only.
TY02	Above Village Creek but below major bend; cobble bar	Moderate risk in late summer because of the abundance of salmon in the area and potentially food-conditioned or habituated bears that also fish at the Klukshu weir. However, relative to the alternatives, it is one of the better sites between the put-in and the Tatshenshini River canyon. River users should be made aware of the concerns about using the site in late summer.
TY03	Squaw Creek mouth	Not recommended, encourage people to use other sites. Moderate to high risk of both displacing and encountering bears in late summer.
TY04	Upstream side of Silver Creek	Not recommended, encourage people to use other sites. Moderate to high risk of both displacing and encountering bears in late summer.
TK05	Downstream side of Silver Creek	Overall, a moderate-risk campsite in late summer. However, bear – human interaction information over the last several years (see Table 5) suggests that there is a human-habituated and possibly food-conditioned grizzly bear in the area. Parks Canada should actively monitor bear – human sightings, encounters, and incidents at this site and nearby sites. River travellers should be made aware of the potential presence of a human-habituated and food-conditioned bear in the area. If people are going to continue to camp here, they should be required to camp on the open alluvial gravel bar as much as possible and discouraged from wandering into the surrounding forest.
TK06a	Upstream side of Bridge Creek	Not recommended. Moderate risk of encountering a bear in all seasons and moderate risk of displacement in late summer. TK06b on the downstream side of Bridge Creek is recommended over this campsite.
TK06b	Downstream side of Bridge Creek	Recommended campsite. People should be encouraged to camp on the open alluvial gravel bar as much as possible and discouraged from wandering into the surrounding forest.
TT07	2-3 km upstream of Quiet Canyon below Bridge R.	A moderate risk site in all seasons. High value habitat in surrounding area. If people camp here, they should be encouraged to camp on the open gravel bar and discouraged from wandering into the surrounding forest.
TT08	Cliff between Quiet Canyon and Detour Ck.	Moderate risk of displacement in all seasons. People should be encouraged to camp on the open gravel/sand island and discouraged from wandering into the surrounding forest.
TT09	Across from Detour Ck. at back channel outlet	Relatively low risk site, however, there has been a food-conditioned bear, likely grizzly, that has broken in to guide/outfitter Jack Goodwin's cabin 5 years in a row, approximately 2 km upstream of TT09 near Detour Creek. River travellers should be made aware of the presence of this bear in the general area. BC Parks should take immediate action to ensure that human food is not available at Jack Goodwin's outfitting camp during the off-season when no one is

Site #[a]	Location Description	Recommendation(s)
		there.
TT10	Upstream side of "Bear Bite" Creek	Relatively low risk site, however, there has been a bear bite a woman through her tent at this site. That type of behaviour suggests the bear was food-conditioned. River travellers should be made aware of the potential presence of this bear in the general area. People should be encouraged to camp in the open on the alluvial fan as much as possible and discouraged from wandering into the surrounding forest.
TT11	Upstream side of Sediments Creek	A moderate risk site in summer and late summer based on the habitat and physical properties. However, bear – human interaction information over the last several years (see Table 5) suggests that there is at least one human-habituated and likely food-conditioned black bear and a human-habituated grizzly bear in the area. Focussed management effort, including perhaps aversive conditioning and campsite closure, appears to be required by BC Parks to reduce the number of bear – human incidents at this site. People should be encouraged to camp at other sites. Sediments Creek is a very popular place to camp and hike and layover for a day. If people are going to continue to be allowed to camp in the area, they should be required to use this site over TT12 on the downstream side of Sediments Creek. BC Parks should actively monitor bear – human sightings, encounters, and incidents at this site and nearby sites (e.g., TT10). River travellers should be made aware of the presence of at least one human-habituated and food-conditioned bear in the area. People should be required to camp in the open as much as possible and not to camp near the forest to the northwest of Sediments Creek. People should also be discouraged from wandering in to the surrounding forest and to be cautious when approaching the clear water source north of Sediments Creek.
TT12	Downstream side of Sediments Creek outlet	Not recommended, close to camping. High risk of encountering or displacing a bear in late summer and moderate risk of encountering a bear in spring and summer.
	Grass knoll hike, Sediments Creek	A trail through high quality bear habitat with a high risk of encountering or displacing bears in all seasons. From a bear – human interaction view-point, this is not a very good location for a trail. However, there does not appear to be any better alternatives in the local area to access the grass knoll viewpoint or the sub-alpine. If the trail is to remain open, then people should be strongly encouraged to: 1. Hike in a group of at least three people, 2. Keep alert and watch for bears and fresh bear sign, 3. Make lots of noise along the forested portion of the trail, 4. Not hike in the early morning or late evening around dusk and dawn, and 5. Hike in the open on the alluvial fan as much as possible to the beginning of the trail in the trees.
TT13	Upstream side of Alkie Creek mouth	Recommended campsite. People should be encouraged to camp on the open alluvial fan just upstream of Alkie Creek mouth and discouraged from wandering into the nearby forest.

Site #[a]	Location Description	Recommendation(s)
TT14	Downstream side of O'Connor River	Not recommended, encourage people to use other sites. Moderate to high risk of encountering a bear in all seasons and moderate to high risk of displacing a bear in spring.
TT15	Across from Henshi Ck.; bay between two rock points	Not recommended, encourage people to use other sites. High risk of encountering a bear and moderate to high risk of displacing a bear in summer and late summer.
TT16	2-3 km down from Henshi Creek at cliff face	Moderate risk site in spring and summer. People should be encouraged to camp on the open sand/gravel bar and discouraged from wandering into the surrounding shrub cover.
TT17	Downstream side of Tats Creek	Not recommended, encourage people to use other sites. High risk of encountering a bear and moderate risk of displacing a bear in all seasons.
TT18	Downstream side of Towagh Creek	Not recommended where people currently camp. There appears to be a human-habituated grizzly bear in the area (see Table 5). The tenting area is within high quality feeding habitat for summer and late summer. There also are bear encounter concerns when people walk to the clear water source behind the tent area. There would be some lower risk if people camped right on the alluvial fan of Towagh Creek, further upstream.
TT19	Large gravel bar upstream of Ninetyeighter Creek	Recommended campsite. People should be encouraged to camp on the open sand/gravel bar and discouraged from wandering into the surrounding shrub cover.
TT20	Mouth of Ninetyeighter Creek	Not recommended, encourage people to use other sites. Moderate to high risk of encountering a bear and moderate risk of displacing a bear in summer and late summer.
TT21	Upstream side of Melt Creek	Not recommended, encourage people to use other sites. High risk of encountering a bear in summer and late summer and moderate to high risk of displacing a bear in summer.
TT22	Downstream side of Melt Creek	Moderate to high risk of displacing and encountering a bear in summer so the site is not recommended. If a site is necessary at the mouth of Melt Creek, then this site is preferable to the site on the upstream side (TT21).
TT23	Petroglyph Island/ Tatshenshini Island	Recommended campsite. Relatively low risk site, but hard to get to now because the river channel on the east side of the island does not have much water in it. People should be encouraged to camp on the open sand/gravel bar and discouraged from wandering around in the adjacent forest. People hiking to the petroglyphs should be encouraged to stay on the trail, hike in a group of at least three people, keep alert, and make lots of noise along forested portions of the trail.
AT110[b]	Downstream side of Reynolds Glacier Creek	Recommended campsite. Relatively low risk site, but recently the creek washed out part of the campsite. The site is also off the main channel of the Alsek River. People should be encouraged to camp on the open alluvial fan and discouraged from wandering into the adjacent forest.
AT111[b]	Netland Glacier view; rock outcrop	Moderate to high risk of encountering a bear in late summer, otherwise a moderate risk site. People should be discouraged from using the site, but if they do they should camp in the open and not wander away from the camp.

Site #[a]	Location Description	Recommendation(s)
AT112[b]	Island campsite #1	Recommended campsite. People should be encouraged to camp in the open as much as possible.
AT113[b]	Island campsite #2	Recommended campsite. Relatively low risk site, but hard to get to because the side channel running by the campsite does not have much water in it. People should be encouraged to camp in the open as much as possible.
AT114	Across from Reynolds Glacier mouth	Moderate risk site in summer and late summer. People should be encouraged to camp in the open and discouraged from wandering away from the camp.
AG201	Several km upstream of corner above Walker Glacier	Not recommended, encourage people to use other sites. Moderate to high risk of encountering a bear in summer and late summer and moderate to high risk of displacing a bear in summer.
	Walker Glacier trails	There are many trails leading from each sub-site, i.e., AG202a to AG202c, toward the glacier. Most trails converge where the mountain side-slope, moraine and lake come together. Some well-used bear trails also meet the glacier trail in this area. The highest risk human trails are primarily those that lead from sub-site AG202a and go through thick alder and poplar where visibility is poor. I recommend that there only be one trail that goes through the moraines and the associated shrub areas to the glacier. Trails from each of the 3 different sub-sites should be routed through the open gravel flats and converge at this main trail at the edge of the moraine/shrub area just north of the lake. The 3 feeder trails and the main trail to the glacier should be well marked with cairns. People hiking to the glacier also should be encouraged to: 1. Hike in a group of at least three people, 2. Keep alert and watch for bears and fresh bear sign, 3. Make lots of noise in the shrubby portions of the trail(s), 4. Not hike in the early morning or late evening around dusk and dawn, and 5. Hike in the open on the gravel bars as much as possible.
AG202a to AG202c	Walker Glacier, sub-sites a to c	Moderate risk site in summer and late summer. People should be encouraged to camp at the 2 most open sub-sites AG202b and AG202c that are toward Walker Glacier Lake and discouraged from using the more confined site AG202a near the large bay at the upstream end of AG202. People also should be encouraged to restrict their activities to the area around each sub-site and discouraged from wandering into the adjacent forested or shrub dominated areas. Bears appear to use these vegetated areas to bypass the campsites.
AG202d	Below the lake at Walker Glacier; sub-site of AG202	Moderate risk of a bear encounter in all seasons because of the potential movement of bears through the site. People should be encouraged to restrict their activities to the area around the campsite and discouraged from wandering into the shrub-dominated area between the back channel and the lake. Bears appear to use this vegetated area to bypass the campsite.
AG203	Below standing waves upstream of Novatak Glacier mouth ("Purple	Recommended campsite. Relatively low risk site with 2 potential use areas. People should be encouraged to camp on the open gravel bar and discouraged from wandering into the patches of dense

Site #[a]	Location Description	Recommendation(s)
	Haze"?)	alder and willow adjacent to the site.
AG204	Approximately 200 m upstream of Novatak Glacier mouth ("Purple Haze"#2?)	Recommended campsite. Low risk site. People should be encouraged to camp in the open as much as possible and discouraged from wandering into the dense alder and willow between AG204 and AG203.
AG205	Alsek Lake spit; upstream site	Not recommended, encourage people to use other sites. Moderate to high risk of encountering and displacing bears in both spring and late summer.
AG206a &b	Alsek Lake spit, sub-sites a & b	Moderate to high risk of encountering and displacing bears in both spring and late summer, so the site is not recommended. If a campsite is necessary on Alsek Lake spit, then sub-site AG206b at the tip of the spit is preferable to sub-site AG206a, which is further upstream along the spit.
AG207	Gateway Knob	Moderate risk of displacing bears in late summer, otherwise a relatively low risk site. There is a food-conditioned hoary marmot at the site, which suggests people are being somewhat sloppy with their food or deliberately feeding it. River travellers should be warned about the dangers of food-conditioning bears by spilling food or leaving it behind. People should be encouraged to camp in the open on the gravel bar and discouraged from wandering into the thick alder and willow adjacent to the campsite.
AG208	Across from Gateway Knob; edge of lake near mouth	Moderate risk of displacing or encountering bears in spring, otherwise a relatively low risk site. This site does not have much shelter from the wind and the risk of bear – human interaction increases the closer people camp to the tall shrub willow and alder. The area is dense with bear root, consequently grizzly bear digs for bear root roots. People should be encouraged to camp in the open sand/gravel bar as much as possible and discouraged from wandering into the thick alder and willow near the campsite.
AG209	Alsek Lake dunes area near outlet of lake	Recommended campsite. Relatively low risk site. People should be encouraged to camp in the open as much as possible and discouraged from wandering into the dense alder and willow adjacent to the site.
AG210	Island on lower Alsek above Dry Bay pullout	Recommended campsite. Relatively low risk site. People should be encouraged to camp in the open as much as possible.
AG211	Dry Bay pull-out campsite and airstrip	Recommended campsite. Relatively low risk site because of the lack of habitat potential in the area, but also because of local human activity. However, because of this human activity and the proximity to the fish plant, there is a higher chance of food-conditioned bears in the area than most other places on the river. People should be warned of this and encouraged not to become complacent in their bear awareness and food and garbage management even though they have reached "civilization". A written warning to that effect should be added to the sign at the Dry Bay pullout.

[a] TY = Tatshenshini River, Yukon; TK = Tatshenshini River, Kluane National Park and Reserve; TT = Tatshenshini River, Tatshenshini-Alsek Park; AT = Alsek River, Tatshenshini-Alsek Park; AG = Alsek River, Glacier Bay National Park and Preserve.

[b] Campsites evaluated in 1998 (see Wellwood and MacHutchon 1999b).

4. Collaborate among management agencies on a *Campsite Use Form*, printed on waterproof paper, which can be given to all river users on the Tatshenshini River and Alsek River. Include enough detail to achieve an interagency wide database, but make the forms as user friendly and as short as possible. The form should include questions that will help determine how frequently specific campsites are being used and the cleanliness of the campsites. This information will be valuable for monitoring changes in campsite use by people. Provide location descriptions of campsites on the form so that people can easily and accurately identify campsite locations. Park staff should provide an overview of the data form to the leader of each private group prior to their departure.
5. Monitor all campsites for increases in bear sightings, encounters, or incidents and close them if necessary (see section 6.5).
6. Monitor the successes or failures of the campsite use restrictions by reviewing campsite use and bear – human interactions on an annual basis.
7. Continue to investigate alternatives for additional low risk campsites.

Possible Future Strategy

During the development of a co-ordinated *Bear Management Plan* for the Tatshenshini River and Alsek River (see section 6.1), bear management and human use objectives should be reviewed to assess whether to designate campsites. Issues to discuss include the acceptable levels of human safety and impacts to bears versus continuing to offer some freedom of campsite choice.

The potential advantages of designated campsites are:

1. The spatial location and human use of campsites is predictable to bears. Jope (1985) suggests that predictable human use was a factor in the lower incidence of conflict on hiking trails compared to off-trail areas. This evidence led Herrero and Fleck (1990) to suggest that recent trends towards increasing injuries in off trail areas may be consistent with Jope's (1985) findings.
2. Certain bears will habituate to the presence of humans at camps and continue to use important feeding areas adjacent to these camps, either when people are there or when they have left. Bears can adjust their activities to avoid humans, if they so choose.
3. Bears that habituate to human presence at campsites and continue to use areas around campsites will be aware of people's location. Therefore, surprise encounters will be less likely to occur.
4. Bears will have access to larger areas of the valley bottom where there is little or no human activity.
5. The benefits of designated campsites can only be achieved if bears do not learn that they can obtain human food or garbage from campsites.

Kluane National Park has instituted designated camping at a number of sites on the upper Alsek River to try and make human activity more predictable to bears (Wellwood and MacHutchon 1999a, 1999c).

The potential disadvantages of designated campsites are:

1. Increased use of certain campsites may increase the displacement of some bears. However, if every group uses a different campsite each night, the potential area of displacement would be much larger.
2. Bears that habituate to the presence of people at camps may begin to "push their limits" and investigate camps, either when people are there or after they have left. Human habituated bears are much more prone to becoming food-conditioned than wary bears are.
3. Many people are not comfortable with human-habituated bears "hanging around" a campsite, even if they don't necessarily pose a threat to human safety.
4. The potential for bears to obtain food from campsites is high because food is not currently required to be "bear-proofed".
5. After repeated human use of one spot, human food odours and spills may begin to concentrate, thereby increasing the attractiveness of those camps to bears.
6. People like to make their own choices about where to camp.
7. The physical impacts on vegetation and soil are greater.
8. Channels will change and the accessibility of some sites may change.
9. The location of campsites may be difficult to describe or find, particularly if there are no major identifying features nearby. Different groups have different navigation skills and many groups don't carry large-scale maps, if any. Given that much of the appeal of the Tatshenshini River and Alsek River is its wilderness character, marking campsites with signs is not likely to be an acceptable option to many people (Dill *et al.* 1997). However, rock cairns may be an effective and less obtrusive solution.

If the agencies responsible for visitor use management on the Tatshenshini River and Alsek River decide to designate specific campsites, then the following should be considered in the selection of sites:

1. For sites that were evaluated during this project, if at all possible, choose ones that were rated low (L) or low to moderate (L-M) potential for bear – human interaction (i.e., encounter and displacement) for all seasons and that were recommended as campsites in Table 4.
2. Sites should be low value bear habitat (i.e., for feeding and travel) relative to other sites. Bears are less likely to be active in the area and, therefore, less likely to be displaced or to encounter people at camps.
3. Sites should be open and provide good visibility. People and bears can detect each other easier.
4. Where possible, try to pick sites, particularly kitchen areas, that flood regularly, such as on sparsely vegetated gravel/sand bars or alluvial fans. Campsites will be periodically cleaned of human food odour and food spills and the vegetation and soil will be impacted less by repeated human use.
5. Ensure that sites are spaced practically and allow for some choice. Groups will travel at different rates depending on weather, start times, and group composition. Designated campsites should be reasonably spaced so that if one campsite becomes inaccessible, alternative campsites are available.

6. Sites should have a convenient pullout and flat areas in close proximity to the river for tents.
7. Try to pick sites that also have shelter from the wind, clear water, and firewood.
8. Try to pick sites that do not have sweepers, logjams, gravel bars, or riffles that catch and hold salmon carcasses. Bears are less likely to be active in the area or to travel through the camp. This is primarily a concern on the upper Tatshenshini River above the canyon.
9. For the benefit of visitors, sites should have scenic views, if possible.

6.0 OTHER MANAGEMENT ISSUES & PROPOSED STRATEGIES

As I mentioned in section 5.3, the major difficulty in suggesting or recommending management strategies for the Tatshenshini River and Alsek River is that there are no established bear management or human management objectives. One of the important short-term tasks of the management agencies should be to co-operatively develop a bear management plan or strategy that outlines these objectives (see section 6.1). A re-evaluation of the successes or failures of any management strategy that is implemented should be conducted periodically, such as every five years.

In the absence of a co-ordinated bear management plan or strategy for the Tatshenshini River and Alsek River, I have approached specific management issues with an emphasis on bear conservation at the potential cost to visitor freedom of choice. My suggested management strategies are intended to be proactive, practical, and effective, however they will also require some sacrifice or expense on the part of human users of the river. I believe the short-term costs to human users will be outweighed by the long-term benefits to human safety and bear conservation. I also believe most people will grudgingly accept some restriction on their freedom if they understand that the measures are intended to ensure their safety, maintain the ecological integrity of the river, and protect bear populations. If the Tatshenshini River and Alsek River are not managed appropriately, human impact will undoubtedly degrade the character of the wilderness that is being sought by visitors.

I believe that proactive rather than reactive management strategies are the most efficient and cost effective way to deal with potential problem issues. As an example, many management agencies elsewhere are spending a great deal of time and money reacting to the complex problems associated with food-conditioned bears. The long-term benefits of a proactive approach to minimizing the chance of bears becoming food-conditioned can be significant, including ensuring human safety, enhancing bear conservation, and reducing the time and financial costs involved in dealing with food-conditioned bears. If management agencies become aware of changes occurring in bear behaviour and habitat use or if data indicate that bear – human interactions are increasing, the source of the problem should be identified and addressed as soon as possible. The maintenance of healthy bear populations requires effective strategies to manage human activities such that they have minimal impacts on bears. This is not an easy task given the existing levels of human use and the demands for increased access and use. However, any strategy that reduces the direct or indirect impacts of humans on bears, no matter how seemingly insignificant, will be important in controlling the incremental cumulative effects of humans on bears and be of conservation benefit to bears.

Control of campsite use is only one of a number of management issues that should be addressed by management agencies to help minimize the potential for negative bear – human interaction on the Tatshenshini River and Alsek River. The following discusses several additional management

issues and suggests strategies to address them. This review draws on the previous work of MacHutchon (1998b), MacDougall *et al.* (1997, 1998), and Wellwood and MacHutchon (1999a, 1999b, 1999c, 1999d, 1999e, 2000) as well as available knowledge from other jurisdictions and other bear – human conflict management specialists. A suggested time frame for implementation of the proposed management strategies is in Table 6 following the discussion.

6.1 Interagency Co-operation

Objectives

1. To ensure that management strategies are implemented co-operatively among the agencies responsible for management of visitor use along the Tatshenshini River and Alsek River.
2. To ensure that information concerning bear – human interactions and visitor management policies are exchanged among the co-operating management agencies.

Background

Prior to the creation of Tatshenshini-Alsek Park, Herrero *et al.* (1993) recommended the development of a bear management plan for the entire Tatshenshini River Valley, including the Alsek River. Despite the four political jurisdictions involved, bears move freely along and between the Tatshenshini River and Alsek River. A problem bear in one jurisdiction is potentially a problem bear in other jurisdictions. In addition, the effects of displacement of bears and other negative impacts in one area can have implications across political boundaries. Given these potentially important habitat and travel links between the Tatshenshini River and Alsek River, an overall bear management plan for the Tatshenshini and Alsek rivers would be beneficial. This campsite assessment project was a significant step toward a co-operative and co-ordinated approach to bear – human management on the Tatshenshini River and Alsek River.

In many circumstances, exchange of information among management agencies about bear – human incidents will be important for the safety of everyone using the Tatshenshini River and Alsek River. This information will increase awareness of events occurring on the rivers and the ability to anticipate potential problems.

Proposed Strategies

1. Develop an interagency or international *Tatshenshini River and Alsek River Bear Management Plan or Strategy* that clearly states the bear management and human management objectives for the Tatshenshini River and Alsek River drainages. Some of these objectives could be the same or similar to those suggested in sections 5.3 and 6.2 to 6.5, that is:
   a) Reduce the risk of bear – human interaction at or near campsites, including the displacement of bears from feeding areas and direct bear – human encounters.
   b) Ensure that bears on the Tatshenshini River and Alsek River do not become food-conditioned.

c) Enable and encourage river users to actively reduce their risk of negative encounters with bears.
d) Limit the timing of group departures, group size, and time on the river to 1) make human use more predictable to bears in time and space, and 2) minimize the indirect human impacts on bears of regular disturbance, habitat displacement, and potential barriers to movement.
e) Ensure that river users report bear – human interactions quickly and accurately and that management agencies respond appropriately to bear – human incidents.

The *Bear Management Plan* would probably work best as a sub-document of an interagency or international *Tatshenshini River and Alsek River Management Plan* as suggested in section 6.4. The *Bear Management Plan* should also outline the roles and responsibilities of different parks staff related to:

a) information to provide to river users;
b) how to complete the *Campsite Use* and *Bear Observation* forms;
c) the prompt reporting of bear – human incidents to Park Rangers or Wardens;
d) the necessary action if a serious bear – human incident, such as a mauling, occurs;
e) the proper documentation of occurrence reports about bear human incidents; and
f) the protocol for communicating among management agencies.

2. Develop a communications protocol, preferably within the *Bear Management Plan*, for exchanging information among agencies regarding bear – human incidents. Most importantly, there should be regular communication between Tatshenshini-Alsek Park, Glacier Bay National Park, and Kluane National Park.
3. Ensure that key Park Ranger or Warden staff obtain appropriate training in bear capture and immobilization.
4. Co-operate on an interagency annual report that summarizes bear – human interactions and campsite use and tracks changes in bear behaviour and bear and human use of campsites. Glacier Bay National Park rangers in Dry Bay will receive the bulk of campsite use and bear observation forms, so they are in the best position to take the lead role on analysing and summarizing the data in a written report. They already produce an annual report that summarizes the existing *Alsek/Tatshenshini River Trip Survey* forms. Other management agencies, particularly BC Parks, should actively participate in the writing of the annual report. Each year's results and apparent changes in bear behaviour and bear and human use of campsites should be discussed at the existing biannual interagency meetings as well as pre-season staff training sessions. Conduct a detailed review of the annual reports every five years.
5. Periodically present a summary of the results and a discussion of the annual reports to commercial operators. If operators and guides are able to see the results of the data they have collected they will likely be encouraged to continue their efforts.
6. Increase the frequency of interagency patrol trips on the Tatshenshini River and Alsek River to ensure river travellers comply with guidelines and regulations.

6.2 Human Food and Garbage Management

Objective

Ensure that bears on the Tatshenshini River and Alsek River do not become food-conditioned.

Background

Proper food and garbage management by all river users, including tourists, parks staff, researchers, guide/outfitters, and local people is the most important factor that will ensure safe bear – human interactions and maintain the wilderness character of the rivers.

There were numerous bear – human incidents reported for the Tatshenshini River and lower Alsek River between 1995 and 1998 (Table 5). There appear to be human-habituated bears in the vicinity of Silver Creek, Sediments Creek and Towagh River. The habituated bears at Sediments Creek and, possibly, Silver Creek also appear to be food-conditioned. In addition, one bear, likely a grizzly bear, has broken in to guide-outfitter Jack Goodwin's cabin on the upper Tatshenshini River near Detour Creek five years in a row and obtained human food each year (G. MacRae, BC Parks, pers. comm.; personal observation). The potential for these bears or other bears to obtain human food or garbage from occupied campsites is high because most groups do not effectively "bear-proof" their food. Rafting groups generally carry a lot of food that is usually stored in large coolers or aluminium boxes. Coolers and food boxes are usually stored in the rafts or near the kitchen area. A pervasive attitude among some commercial groups is that they have never had a problem with bears, therefore, there is no need to change current practices. I believe it is just a matter of time before there are more bear – human incidents at camps. It only takes one group to be sloppy with their food or garbage for bears to learn how easy it is to get. Subsequent groups, no matter how conscientious they are, will suffer the consequences. The prevalence of food-conditioned bears in other areas of Canada and the U.S., where bear proofing was not practiced, indicates that food conditioning could become a problem on the Tatshenshini River and Alsek River if human food and garbage are not made inaccessible to bears. Energetically and socially stressed sub-adult bears, particularly the offspring of habituated females, are candidates for food-conditioning if they get easy access to human food or garbage, including food spills. Bear proofing of food should be considered as essential a safety measure as investing time and money into life jackets, throw bags and river rescue preparation.

Bear-proof food canisters designed for hikers have successfully reduced bear problems in Denali National Park, Alaska (Dalle-Molle and Van Horn 1989) and Kluane National Park, Yukon (Wellwood and MacHutchon 1999d). There are commercial models available for canoes and kayaks as well. These canisters can be an effective option for small canoe or kayak groups to bear-proof their food. Rafting groups, however, particularly a large commercial group, typically carry a large amount of food that takes a large amount of space, is heavy, and is cumbersome to move around. The challenge is to develop a bear-resistant food storage system that is compact, affordable, and as easy to use as possible. Potential options for bear proofing

food for large groups include a welded aluminium cooler or locker with a locking mechanism that bears cannot break into, permanently installed bear-proof containers or caches at campsites, or portable electric fences.

Table 5. Significant bear – human interactions reported for the Tatshenshini River and Alsek River, Yukon, B.C., and Alaska in permit system reports written by U.S. National Park Service staff, 1995-1998.

Year	Bear – Human Interactions Reported	Permit System Report Comments
1995	1. Three encounters at or near Sediments Creek. In only one case did a bear appear threatening. CRE – grizzly bear at Sediments was not very wary; used air horns and flares but it would not leave the vicinity. Ecosummer – black bear at Sediments seems very habituated. 2. Early July CRE trip – black bear ripped tent. 3. 47 parties reported one or more encounters with bears with no problems. These encounters included sighting bears along the shoreline, bears near camp, and bears encountered while hiking. 4. "We had several bear encounters. All panned out without any problem. The bears only approached as far as was necessary to identify our smell. Then they all took different paths to bypass us. We had separate sites for the food containers; they were never touched by these bears."	"Unfortunately, we are still not getting the co-operation of commercial rafting companies reporting bear incidents. The incidents we know about are a direct result of the Alsek River VIP interviewing commercial and private rafters at the Dry Bay campground" (Rick Mossman, Yakutat District Ranger)
1996	There were three known incidents with property damage and no injuries. 1. A grizzly bear ripped a hole in a raft on the bank at Silver Creek while trying to get at food in coolers. The bear did not get any food and was scared away by the rafters although he stayed in the area until they left. 2. A large black bear entered a camp on river left 2 miles below the Tatshenshini and Alsek confluence and could not be scared out by yelling, rocks, banging pots or nearby gunshots. It entered five tents, found no food and did minor damage to one tent then left the area. 3. A young black bear entered a camp on Gateway Knob and entered several tents while most of the group was hiking. The group attempted to scare it with flares, yelling, rocks, and pepper spray (ineffective in the wind) without much effect. The bear tore two tents and left with a lavender Patagonia pullover when four commercial guides advanced on it as a group. 4. We received 11 other reports of bears uncomfortably close that were unafraid or curious, but did not enter campsites. Only two groups did not see bears during their trips. Except 2 young grizzly bears at Walker Glacier (seen 3 times, but they stayed at least 100 yards from campsites) there was no consistent pattern to these incidents.	"Reporting of bear incidents and sightings was generally better than in 1995."
1997	Private groups: 1. A bear was reported in a camp at the Novatak Glacier. 2. A bear was reported in a camp at Alsek Lake Spit. 3. A black bear in a camp at Sediments Creek did not respond to spray, rocks, or "bear banger". Another group reported a bear at Sediments (within 100 yards of camp) about the same time, most likely the same bear. 4. Two groups reported a bear circled a camp at Silver Creek. 5. Dry Bay had periodic bear problems including a flattened campsite. Commercial groups:	

Year	Bear – Human Interactions Reported	Permit System Report Comments
	1. Sediments Creek; black bear within 100 yards of camp. 2. Sediments Creek; a brownish black bear came into kitchen area while clients were within 15 yards. Knocked over propane tank and kitchen box. Sat and watched camp within 10 yards of camp. 3. Purple Haze; young bear dragged off one bag (was recovered). 4. Border hike; black bear came about 20 feet towards the group but moved away quickly. 5. Below Reynolds; cubs came twice into camp. 6. One ran through camp enroute to swimming in Tatshenshini.	
1998	Private groups: 1. Black bear approximately 1 mile above Ninetyeighter Creek. Ran away at first then returned 20 minutes later, stared, then slowly walked away. 2. One 3.5 year old trotted toward us in a curious, non-aggressive manner. 3. One followed us down river about 50 yards from Sediments Creek. 4. Towagh Creek; grizzly within 50 yards of kitchen, air horn slowly deterred him. 5. Towagh Creek; grizzly bear walked into our kitchen, was not afraid, meandered away. 6. Grizzly at 1 night campsite ran at us. We ran to our boats and he left. 7. Dune camp on Alsek Lake; walked into camp while we were eating dinner. 8. Silver Creek; in camp, acted both unusually and in an aggressive manner. 9. Someone called "Bob" on private group due out at Dry Bay on 30th September boasted about harassing a bear and then eating its salmon. Commercial groups: 1. Confluence of Tatshenshini and Alsek; subadult who would not leave as we tried to stop. We moved on to another camp below Reynolds Glacier. 2. Sediments Creek; sighting, did not seem afraid; possibly habituated to people.	

On several Alsek River raft trips and on the Tatshenshini River and lower Alsek River trip we used an electric fence to assess its feasibility in field situations (Wellwood and MacHutchon 1999a, b). The fence took relatively little space and most campsites had a substrate that facilitated installation of the fence. With some practice, complete set-up, including moving food from rafts, took less than 30 minutes. The shortcomings of electric fences were:

- Fences were subject to human error. Fences that are not set up properly will be ineffective;
- Not all campsites had a substrate suitable for setting up an electric fence;
- Removing food from rafts is time and labour intensive.

Proposed Strategies

1. Provide information on managing human food and garbage to river users through an active public education and bear awareness program (see section 6.3).
2. River users should be required to have at least one person stay with boats or at campsites when others in the group go hiking.
3. Management agencies should provide information on the recommended actions to take if a bear approaches a raft or the campsite while others in the group are away.
4. Management agencies should encourage river users to bear-proof their food. If bears are prevented from accessing human food and garbage, there will be a significant reduction in the number of bears becoming food-conditioned and in the possible consequences such as damaged equipment or human injury or death. In addition, fewer food-conditioned bears would be killed and management agencies would save considerable time, effort and money if they do not have to deal with food-conditioned bears.
5. Management agencies should investigate methods for bear-proofing food that would be practical and acceptable to river users and implement these methods as soon as possible. It will be a challenge is to develop a bear resistant food storage system that is compact, affordable and as easy to use as possible. There are bear proof food canisters available for small groups and there are an increasing number of bear-resistant containers available that may be appropriate for large raft groups. The development of a bear-proof cooler or box suitable for raft frames seems to be the most practical solution. Other options could be electric fences around food containers or permanent bear-resistant containers or caches at campsites, but both methods would require food containers to be hauled from rafts.
6. Management agencies should inform people of the potential risks to people, equipment, and bears of not bear proofing food and attractants. People should understand that a problem bear might not necessarily be their fault, it may be a result of the actions of people that were at a campsite before them.
7. River users should be encouraged to report bear – human incidents as soon as possible and management agencies should respond immediately.
8. When practical methods are in place for bear proofing of human food and garbage, bear-proof storage of food and garbage should be made mandatory for all river users. Once this mandatory policy is in effect, established penalties for improper food and garbage storage or handling, particularly if a bear problem develops. People are motivated to follow guidelines when there is a potential economic loss to disregarding them. Penalties for private groups would likely have to be monetary, but penalties to commercial groups could include revoking their park use permits for a portion of the following year or for good in extreme cases. This kind of policy can increase the incentive for all river users to put peer pressure on groups that are not following the guidelines because everyone will suffer the consequences of someone's mistakes. Potential disadvantages are that it would be a challenge to set tangible targets or limits that define "improper food and garbage handling" and there would be additional costs to the management agencies in time and money, particularly for enforcement.

9. Required use of a fire pan for all fires. Bears would not be attracted to campsites because of food spills or improperly burned garbage in fire pits, the aesthetics of campsites would be more easily maintained, and there would not be an accumulation of fire pits at campsites.
10. Ensure that the mandatory collection and carrying out of human waste implemented by Glacier Bay National Park is supported and promoted by the other management agencies. Requiring use of a portable toilet for human waste has a number of advantages, including bears are not attracted to campsites because of human waste, people's movements to a specific toilet location can be more predictable to bears, there would be less risk of people encountering or displacing bears in adjacent forests, campsites would not become human waste dumps, and there would be less risk of contaminating the river, which is also the main drinking water supply.
11. Focussed management effort, including perhaps aversive conditioning or campsite closure, appears to be required by BC Parks at and near Sediments Creek campsite to reduce the number of bear – human incidents.
12. BC Parks should take immediate action to ensure that human food or garbage is not available to bears at any outfitting camp on the Tatshenshini River or Alsek River during the off-season.
13. Yukon Department of Renewable Resources should take action to ensure that human food or garbage is not available at Sawshe/Dalton Post, the Klukshu weir and camp, fishing camps, or outfitting camps along the upper Tatshenshini River.

6.3 Public Education and Awareness

Objective

Enable and encourage river users to actively reduce their risk of negative encounters with bears.

Background

The success of any park management program is dependent on well-informed and conscientious park users (Jingfors 1995). This requires interesting and effective public education materials, but it also requires knowledgeable and conscientious park staff. Visitors to the Tatshenshini River and Alsek River generally will be interested in the environment and the animals that live there. Interpretative information that increases their understanding of bear ecology can also increase their appreciation and respect for bears and motivate them to make the extra effort necessary to minimize conflicts (Jingfors 1995). In addition, people are more likely to endorse procedural guidelines if they understand the negative implications to bears and other wildlife of not following them.

A Kluane National Park bear awareness survey on the Alsek River revealed that many people were not actively taking measures to avoid encounters with bears such as, looking for bear sign, making noise, and preparing by reading bear safety literature (Dill *et al.* 1997, Wellwood and MacHutchon 1999a). If people ignore these simple precautions, the potential for a surprise encounter with a bear is high. Wellwood and MacHutchon (1999a, b) also found that groups on the Alsek River increased their potential for conflict with bears because:

1. To ensure privacy, portable toilets were placed far from the main group in dense bush, sometimes upwind of the campsite. People approaching the toilet made little noise, thus potentially surprising a bear in the area, and
2. No private or commercial river users were observed storing food in bear-proof containers. Several groups secured food in dry bags or in coolers tied closed with webbing straps. Both of these methods may reduce odours that could attract bears, however they would not stop a bear that was intent on obtaining food.

Native people have been living and travelling on the land for thousands of years. They likely have learned ways to co-exist with all wildlife, including bears and this way of life needs to be respected. Non-native cultures in North America have also learned of ways to co-exist with bears, so there is lots of information and some technology available from several sources that could make living and travelling on the land safe for both humans and bears. Relevant information on human safety around bears could be compiled from this variety of sources and provided to everyone living, working, or travelling along the Tatshenshini and lower Alsek rivers.

Parks Canada revised their "*You are in Bear Country*" brochure in 1999 and it contains up to date information. Parks Canada and the U.S. National Parks Service have also financially contributed to the production of a video on human safety in bear country, titled "*Staying Safe in Bear Country*", that is being produced by an independent steering committee backed by the International Association for Bear Research and Management. Production is targeted for completion in fall 2000.

Proposed Strategies

1. All park staff who will be dealing with the public should receive comprehensive bear safety orientation training. Without a good understanding of the principles and practices of staying safe around bears, staff will not be able to respond to important questions that may be asked by visitors and they may end up perpetuating misinformation.
2. Management agencies should collectively develop education materials for commercial and private groups on bear awareness, camp cleanliness, food choices, disposal of gray-water, disposal of human waste, and bear encounter strategies. Education materials could be contained within a pre-trip information package and should focus on the importance of both understanding and applying the principles covered. The overall goal of education materials and pre-trip information should be to ensure that people understand how and why:
   a) they can be proactive in reducing risk to themselves and others and their impact on bears;
   b) their actions may unnecessarily increase risk to themselves and the people that follow them; and
   c) the potential consequences of their mistakes are food-conditioned bears being shot, more restrictions on human use of the river, and potential financial penalties.

   There would be additional cost to the management agencies to implement a comprehensive public education program, however, the benefits of education and awareness will outweigh

any short-term costs and can reduce potential bear – human conflicts that will cost money to respond to.

3. Public education programs that focus on bears should include information on ways to travel in bear country to avoid bear encounters and to avoid inadvertently displacing bears from important habitats. MacDougall *et al.* (1997) and Wellwood and MacHutchon (1999a, b) suggested the following for pre-trip information packages:
   a) How to differentiate between grizzly and black bears based on appearance and field sign;
   b) Information specifically directed at grizzly and black bear ecology in the area. Describe the ecological characteristics of the Tatshenshini River and Alsek River that are relevant to people understanding the food habits, distribution, and movements of bears in the parks. This type of information can be beneficial for both decreasing bear – human interactions and increasing the appreciation and understanding of bears in the parks;
   c) A discussion of the processes of habituation and food-conditioning;
   d) Information on how to avoid attracting bears to a campsite, including campsite selection, and food, garbage and waste management;
   e) Information on safe hiking in bear country;
   f) A statement that an encounter may occur despite all necessary precautions and general guidelines on how to behave during a bear encounter;
   g) An introduction to the bear – human interaction monitoring program (see section 6.5);
   h) Locations or contacts for reporting all observations or problem bear behaviour; and
   i) Further information and suggested readings.

   Visitors should be encouraged to read the "*You are in Bear Country*" brochure or similar information in the pre-trip information package. Visitors also should be provided with the opportunity to view the "*Safety in Bear Country*" video that is currently being produced.
4. Promote a "pack in/pack out" policy to park visitors.
5. Properly identify the dangers of approaching bears too closely and the legal implications of feeding or harassing wildlife.
6. Request that visitors record and report any bear observations, encounters or incidents to parks staff (see section 6.5).
7. Recommend that visitors travel in a group of six or more people when travelling on the river and camping. As the popularity of river travel continues to rise, the level of private use is expected to increase and there likely will be an increase in the number of smaller groups. Bears can act more aggressively towards small groups than large groups (Herrero 1985, Albert and Bowyer 1991), therefore bears may be more likely to try and obtain human food from small groups.
8. Consider recommending that visitors carry a deterrent against bear attacks, such as bear spray (also known as red pepper or capsicum spray). Although bear spray is not guaranteed effective in preventing attack, it has frequently proved successful. Noise-makers, such as air horns or cracker shells, also may be effective in deterring bears in some situations.

9. Encourage the publishing of accurate, up-to-date information by providing current bear awareness and pre-trip information materials for use in any guidebooks published on recreation along the Tatshenshini River and Alsek River.
10. Compile any First Nation knowledge about human safety around bears that can be used in the bear awareness material made available to park visitors. In turn, provide local native groups with materials available from other sources on human safety around bears.

6.4 Human Use

Objective

Limit the timing of group departures, group size, and time on the river to:
1) make human use more predictable to bears in time and space, and
2) minimize the indirect human impacts on bears of regular disturbance, habitat displacement, and potential barriers to movement.

Background

There is some data on the thresholds of human use that are tolerable by bears (Olson and Gilbert 1994, Chi and Gilbert unpubl. manuscript), however, it is difficult to generalize the actual disturbance levels from one area to another. Bears with different experiences with people can have different responses to the same level of disturbance. Generally, wary bears that experience neutral interactions with people, including not being harassed, hunted or shot at, will eventually habituate to groups of people on the river and be less disturbed by them. The number of bears tolerant or habituated to people and their level of use of an area likely increases, reaches an asymptote and then decreases as human use increases (Mattson 1990). This asymptote or threshold of human use is unknown, however, the USDA Forest Service (1990), in the development of a cumulative effects model (CEM) for grizzly bears, adopted a threshold level of 80 parties/month over which human use was considered high intensity. Gibeau *et al.* (1996) and Gibeau (1998) subsequently defined the threshold between high and low human use in Banff National Park as 100 people/month.

Human use of the Tatshenshini River and Alsek River is officially managed through separate policies established by the different management agencies. Glacier Bay National Park developed an *Alsek River Visitor Use Management Plan* in 1989. British Columbia has the *River Rafting Standards and Regulations of British Columbia* (also accepted by the Government of the Yukon Territory), BC Parks *Bear-Human Conflict Reduction Guidelines for River Rafting* (produced in 1998), and the 1995 *Environmental and Safety Standards and Ethics for Expeditions on the Tatshenshini and Alsek Rivers*. Kluane National Park updated their *Alsek River Management Guidelines* in 1996. There is need for a co-ordinated and co-operative joint river management plan that is endorsed and regulated by all management agencies.

Glacier Bay National Park's *Alsek River Visitor Use Management Plan* was developed to establish the policies and procedures to guide management of visitor use on the portion of the

Alsek River watershed within Glacier Bay National Park. They set limits on total use, allocation of trips, scheduling of trips, group size, and stay limit. Glacier National Park's current policy is to allow a maximum of one take-out at Dry Bay each day and BC Parks and Parks Canada have scheduling agreements with commercial groups that limit departures to one per day on the Tatshenshini River and Alsek River.

On the Alsek River specifically, Parks Canada is moving towards more limited use by reserving 51% of the departure days for the 'resource' (i.e., no departures) and 49% of the departure days for users. User days would then be split between commercial and private groups according to historic use patterns. Commercial users endorsed a similar concept at a rafting meeting in 1997, provided that they could maintain historic use levels (T. Elliot, Parks Canada, pers. comm.). Recently, there has been an increase in demand for longer trips on the Alsek River, which may allow user days to exceed historic levels if an upper limit is not identified. (T. Elliot and K. McLaughlin, Parks Canada, pers. comm.). Increased user days would undermine management actions to try and limit departure days. Kluane National Park limits group sizes on the Alsek River to 15 people including guides, however some commercial groups are permitted to have groups of 25 under a grandfather agreement. Private groups run trips on both the Tatshenshini River and Alsek River, but most recreational use of both these rivers is by commercial rafting companies.

Proposed Strategies

1. Develop an interagency or international *Tatshenshini River and Alsek River Management Plan* that clearly states the human use objectives for the Tatshenshini River and Alsek River drainages.
2. Maintain the policy of only one group departure each day or reduce departures to every other day.
3. Formally identify and implement a quota for the maximum number of departures on a per month basis.
4. Formally identify the maximum number of nights per party that can be spent on the river. Strategies 2 to 4 will help prevent user days and, therefore, potential displacement of bears from increasing.
5. Encourage people to restrict their activity to a small area around campsites except where there are specified trails or hiking routes. People's activity at campsites would be more predictable to bears and there would be less risk of people encountering or displacing bears in adjacent forests.

6.5 Bear Sightings, Encounters & Incidents

Objective

Ensure that river users report bear – human interactions quickly and accurately and that management agencies respond appropriately to bear – human incidents.

Background

Sightings or observations of bears can provide some qualitative information on the relative distribution of bears along the Tatshenshini River and Alsek River and potential areas needing increased management action. Bear – human encounters can provide the same qualitative information as bear sightings, as well as information on the general wariness or level of human-habituation of bears along the rivers. Bear – human incidents or conflicts are serious events that may compromise or threaten human safety. They need to be responded to as quickly and efficiently as possible. Quick and accurate reporting would ensure that the agencies respond appropriately and area closure warnings could be given to departing groups. Encounters would not need immediate action, however the future behaviour of the bear should be monitored.

Glacier Bay National Park currently has an *Alsek/Tatshenshini River Trip Survey* form that includes questions about both campsite use and bear sightings, encounters and incidents. Kluane National Park currently has a park-wide *Bear Observation Form.* A common *Bear Observation Form* that is developed and endorsed by all management agencies would be beneficial in standardizing data collection and reducing the number of forms that visitors have to fill out.

To date, the return success of bear observation forms in Kluane National Park has been low (K. McLaughlin, Parks Canada, pers. comm.). This may be partly because river users believe that the information will be used to reduce their freedom on the river, which, depending on the circumstances, may be the case. However, gaining the co-operation of commercial groups may be more achievable if they are aware that the information is intended to help maintain the ecological integrity of the river and protect bear populations. The low return of forms may also be because the forms are not standardised and they are not easy to submit. When there are multiple forms it takes extra effort to become familiar with each. For many river users getting away from human induced inconveniences such as forms is likely part of the attraction of wilderness travel. In addition, commercial guides have many details they must attend to prior, during and after each trip. This leaves little time to complete and submit the bear observation forms.

Proposed Strategies

1. Collaborate among management agencies on a *Bear Observation Form*, printed on waterproof paper, which can be given to all river users on the Tatshenshini River and Alsek River. Include enough detail to achieve an interagency wide database, but make the forms as user friendly and as short as possible. Appendix 3 is a proposed interagency *Bear Observation Form* that was adapted from the Kluane National Park *Bear Observation Form*. This form could be the basis of an interagency data collection protocol in combination with an interagency *Campsite Use* form (see section 5.3). Park staff should provide an overview of the data form to the leader of each private group prior to their departure.

2. Management agencies should include emergency contact phone numbers on the *Bear Observation Form* for reporting bear – human incidents if the group has a satellite phone or immediately upon their arrival in Dry Bay.
3. The form should ask people to report animal carcasses in the vicinity of bear observations. River users should be warned to avoid areas where a carcass has been observed and encouraged to report the observation as soon as possible so that following parties can be warned.
4. Encourage all visitors to submit the forms to the rangers or other parks staff at Dry Bay and support Glacier Bay National Park's efforts to collect information in person at Dry Bay. Also include the mailing address of the management agencies on each form and an addressed stamped envelope. Investigate methods to provide incentive for returning forms. Co-operation from commercial groups should be considered favourably in their permit evaluation. A post season reminder to groups that have not submitted forms may increase submission success rates. If forms are not being submitted it may be necessary to make their return a mandatory condition in the licensing agreement. For private groups, some form of token reward in the form of a park souvenir may increase submission rates.
5. Management agencies should include definitions of bear observations, encounters and incidents in the pre-trip information package.
6. Develop a co-operative communication arrangement among management agencies for the sharing of information on bear – human interactions occurring along and near the Tatshenshini River and Alsek River.
7. Use the bear sighting, encounter, and incident database to evaluate potential problem areas along the Tatshenshini River and Alsek River.
8. Conduct a detailed review of the bear sightings, encounters, and incidents recorded on past Glacier Bay National Park *Alsek/Tatshenshini River Trip Survey* forms. Try to incorporate this data into the interagency wide database developed with the new reporting forms.
9. Conduct an annual pre-season training session for rangers, wardens and other park staff to discuss the purpose and importance of the data that is being collected on bear sightings, encounters, and incidents.

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Table 6. The suggested time-frame for the implementation of the proposed bear management strategies, discussed in detail in sections 6.1 to 6.5, for the Tatshenshini River and lower Alsek River, Yukon, B.C., and Alaska.

Section / Number	Strategies	Implementation Stage	
		5 year	10 year
5.3	**Campsite Use**		
	Objective – Reduce the risk of bear – human interaction at or near campsites, including the displacement of bears from feeding areas and direct bear – human encounters.		
1	Encourage the use of recommended campsites and discourage use of those that are considered of moderate or higher risk of bear – human interaction.	√	
2	If people are allowed to camp at sites with moderate or higher risks for which additional restrictions have been suggested, then they should be warned of the potential risks of using these sites	√	
3	All river travellers should be encouraged to closely follow safety in bear country principles when at campsites.	√	
4	Collaborate among management agencies on a *Campsite Use Form*, printed on waterproof paper, which can be given to all river users on the Tatshenshini River and Alsek River.	√	
5	Monitor all campsites for increases in bear sightings, encounters, or incidents and close them if necessary.	√	
6	Monitor the successes or failures of the campsite use restrictions by reviewing campsite use and bear – human interactions on an annual basis.	√	
7	Continue to investigate alternatives for additional low risk campsites.		√
6.1	**Interagency Co-operation**		
	Objectives – 1. To ensure that management strategies are implemented co-operatively among the agencies responsible for management of visitor use along the Tatshenshini River and Alsek River. 2. To ensure that information concerning bear – human interactions and visitor management policies are exchanged among the co-operating management agencies.		
1	Develop an interagency or international *Tatshenshini River and Alsek River Bear Management Plan or Strategy* that clearly states the bear management and human management objectives for the Tatshenshini River and Alsek River drainages.	√	
2	Develop a communications protocol, preferably within *the Bear Management Plan*, for exchanging information among agencies regarding bear – human incidents.	√	
3	Ensure that key Park Ranger or Warden staff obtain appropriate training in bear capture and immobilization.		√
4	Co-operate on an interagency annual report that summarizes bear – human interactions and campsite use and tracks changes in bear behaviour and bear and human use of campsites.	√	
5	Periodically present a summary of the results and a discussion of the annual reports to commercial operators.		√

Section / Number	Strategies	Implementation Stage	
		5 year	10 year
6	Increase the frequency of interagency patrol trips on the Tatshenshini River and Alsek River to ensure river travellers comply with guidelines and regulations.	√	
6.2	**Human Food and Garbage Management**		
	Objective – Ensure that bears on the Tatshenshini River and Alsek River do not become food-conditioned.		
1	Provide information on managing human food and garbage to river users through an active public education and bear awareness program (see section 6.3).	√	
2	River users should be required to have at least one person stay with boats or at campsites when others in the group go hiking.	√	
3	Management agencies should provide information on the recommended actions to take if a bear approaches a raft or the campsite while others in the group are away.	√	
4	Management agencies should encourage river users to bear-proof their food.	√	
5	Management agencies should investigate methods for bear-proofing food that would be practical and acceptable to river users and implement these methods as soon as possible.	√	
6	Management agencies should inform people of the potential risks to people, equipment, and bears of not bear proofing food and attractants.	√	
7	River users should be encouraged to report bear – human incidents as soon as possible and management agencies should respond immediately.	√	
8	When practical methods are in place for bear proofing of human food and garbage, bear-proof storage of food and garbage should be made mandatory for all river users.	√	
9	Required use of a fire pan for all fires.	√	
10	Ensure that the mandatory collection and carrying out of human waste implemented by Glacier Bay National Park is supported and promoted by the other management agencies.	√	
11	Focussed management effort, including perhaps aversive conditioning or campsite closure, appears to be required by BC Parks at and near Sediments Creek campsite to reduce the number of bear – human incidents.	√	
12	BC Parks should take immediate action to ensure that human food or garbage is not available to bears at any outfitting camp on the Tatshenshini River or Alsek River during their off-season.	√	
13	Yukon Department of Renewable Resources should take action to ensure that human food or garbage is not available at Sawshe/Dalton Post, the Klukshu weir and camp, fishing camps, or outfitting camps along the upper Tatshenshini River.	√	
6.3	**Public Education and Awareness**		
	Objective – Enable and encourage river users to actively reduce their risk of negative encounters with bears.		
1	All park staff who will be dealing with the public should receive comprehensive bear safety orientation training.	√	

Section / Number	Strategies	Implementation Stage	
		5 year	10 year
2	Management agencies should collectively develop education materials for commercial and private groups on bear awareness, camp cleanliness, food choices, disposal of gray-water, disposal of human waste, and bear encounter strategies.	√	
3	Public education programs that focus on bears should include information on ways to travel in bear country to avoid bear encounters and to avoid inadvertently displacing bears from important habitats.	√	
4	Promote a "pack in/pack out" policy to park visitors.	√	
5	Properly identify the dangers of approaching bears too closely and the legal implications of feeding or harassing wildlife.	√	
6	Request that visitors record and report any bear observations, encounters, or incidents to parks staff	√	
7	Recommend that visitors travel in a group of six or more people when travelling on the river, camping, and hiking.	√	
8	Consider recommending that visitors carry a deterrent against bear attacks.		√
9	Encourage the publishing of accurate, up-to-date information by providing current bear awareness and pre-trip information materials for use in any guidebooks published on recreation along the Tatshenshini River and Alsek River.		√
10	Compile any native knowledge about human safety around bears that can be used in the bear awareness material made available to park visitors.		√
6.4	**Human Use**		
	Objective – Limit the timing of group departures, group size, and time on the river to: 1. make human use more predictable to bears in time and space, and 2. minimize the indirect human impacts on bears of regular disturbance, habitat displacement, and potential barriers to movement.		
1	Develop an interagency or international *Tatshenshini River and Alsek River Management Plan* that clearly states the human use objectives for the Tatshenshini River and Alsek River drainages.	√	
2	Maintain the policy of only one group departure each day or reduce departures to every other day.	√	
3	Formally identify and implement a quota for the maximum number of departures on a per month basis.	√	
4	Formally identify the maximum number of nights per party that can be spent on the river.	√	
5	Encourage people to restrict their activity to a small area around campsites except where there are specified trails or hiking routes.	√	
6.5	**Bear Sightings, Encounters & Incidents**		
	Objective - Ensure that river users report bear – human interactions quickly and accurately and that management agencies respond appropriately to bear – human incidents.		

Section / Number	Strategies	Implementation Stage	
		5 year	10 year
1	Collaborate among management agencies on a *Bear Observation Form*, printed on waterproof paper, which can be given to all river users on the Tatshenshini River and Alsek River.	√	
2	Management agencies should include emergency contact phone numbers on the *Bear Observation Form* for reporting bear – human incidents if the group has a satellite phone or immediately upon their arrival in Dry Bay.	√	
3	The form should ask people to report animal carcasses in the vicinity of bear observations.	√	
4	Encourage all visitors to submit the forms to the rangers or other parks staff at Dry Bay and support Glacier Bay National Park's efforts to collect information in person at Dry Bay.	√	
5	Management agencies should include definitions of bear observations, encounters and incidents in the pre-trip information package.	√	
6	Develop a co-operative communication arrangement among management agencies for the sharing of information on bear – human interactions occurring along and near the Tatshenshini River and Alsek River.	√	
7	Use the bear sighting, encounter, and incident database to evaluate potential problem areas along the Tatshenshini River and Alsek River.	√	
8	Conduct a detailed review of the bear sightings, encounters, and incidents recorded on past Glacier Bay National Park *Alsek/Tatshenshini River Trip Survey* forms.	√	
9	Conduct an annual pre-season training session for rangers, wardens and other park staff to discuss the purpose and importance of the data that is being collected on bear sightings, encounters, and incidents.	√	

7.0 LITERATURE CITED

Albert, D.M., and R.T. Bowyer. 1991. Factors relating to grizzly bear-human interactions in Denali National Park. Wildlife Society Bulletin. 19:339-349.

Askey. E., and P. Williams. 1992. Tatshenshini-Alsek River use study. Centre for Tourism Policy and Research, Simon Fraser University, Burnaby. 100 pp. + app.

BC Environment. 1996. Human-bear conflict in British Columbia: draft discussion paper. B.C. Ministry of Environment, Lands and Parks, Victoria. 70 pp.

Chi, D.K., and B.K.Gilbert. Manuscript. Habitat security for Alaskan black bear at key foraging sites: are there thresholds for human disturbance? Ursus:000:000.

Ciarniello, L.M. 1996. Management plan to reduce negative human-black bear interactions: Liard River Hot Springs Provincial Park, British Columbia. M.Sc. Thesis. University of Calgary, Calgary. 228 pp.

Dalle-Molle, J.L., and J.C. Van Horn. 1989. Bear-people conflict management in Denali National Park, Alaska. Pages 121-127 *in* NWT Department of Renewable Resources, Bear-people conflicts: proceedings of a symposium on management strategies, Yellowknife, N.W.T.

Dill, S., S. Jackson, and P. Wright. 1997. Kluane wilderness study. Centre for Tourism Policy and Research, School of Resource and Environmental Management, Simon Fraser University, Burnaby.

Douglas, G.W. 1974. Montane zone vegetation of the Alsek River region, southwestern Yukon. Canadian Journal of Botany 52:2505-2532.

Fuhr, B., and A. Edie. 1990. Tatshenshini grizzly bear reconnaissance. B.C. Ministry of Environment, Smithers. 4 pp.

Geddes Resources Limited. 1990. Windy Craggy Project. Stage 1 Environmental Impact Assessment. Geddes Resources Limited, Vancouver.

Gibeau, M.L. 1998. Grizzly bear habitat effectiveness model for Banff, Yoho, and Kootenay National Parks, Canada. Ursus:235-241.

_____, S. Herrero, J.L. Kansas, and B. Benn. 1996. Grizzly bear population and habitat status in Banff National Park: a report to the Banff Bow Valley Task force. University of Calgary, Alberta. 62 pp.

Gilbert, B.K. 1989. Behaviourial plasticity and bear - human conflicts. Pages 1-8 *in* NWT Department of Renewable Resources, Bear-people conflicts: proceedings of a symposium on management strategies, Yellowknife, N.W.T.

Gunther, K.A. 1990. Visitor impact on grizzly bear activity in Pelican Valley, Yellowstone National Park. International Conference on Bear Research and Management 8:73-78.

_____. 1994. Bear management in Yellowstone National Park, 1960-1993. International Conference on Bear Research and Management 9:549-560.

Hegmann G. 1995. A cumulative effects assessment of proposed projects in Kluane National Park Reserve, Yukon Territory. Environmental Research Centre, University of Calgary, Calgary. 135 pp.

Herrero, S. 1985. Bear attacks: their causes and avoidance. Lyons and Burford, New York. 287 pp.

_____. 1989. The role of learning in some fatal grizzly bear attacks on people. Pages 9-14 *in* NWT Department of Renewable Resources, Bear-people conflicts: proceedings of a symposium on management strategies, Yellowknife, N.W.T.

_____, and S. Fleck. 1990. Injury to humans inflicted by black, grizzly bears or polar bears: recent trends and new insights. International Conference on Bear Research and Management 8:25-32.

_____, A. Holcroft Weerstra, R.M. Roth, and L. Wiggins. 1993. The conservation significance of bears and their habitat in the Tatshenshini River Valley. Canadian Wildlife Federation, Ottawa. 34 pp.

Holcroft, A.C. 1986. Aspects of black bear ecology and campground planning in southwestern Alberta. M.Sc. Thesis, University of Calgary, Calgary. 90 pp.

Jackson, S., and P. Wright. 1998. Policy and research. Simon Fraser University, Burnaby.

Jingfors, K. 1995. Bear - people conflict prevention plan. BC Parks, B.C. Ministry of Environment, Lands and Parks, Victoria. 45 pp.

Jope, K.L. 1985. Implications of grizzly bear habituation to hikers. Wildlife Society Bulletin 13:32-37.

Liddle, W.B. 1994. The value of wilderness, an socio-economic perspective on the transborder protected areas of Yukon, Alaska and British Columbia. Pages 350-352 *in* J.

Peepre and B Jickling, eds. Northern Protected Areas and Wilderness. Canadian Parks and Wilderness Society and Yukon College, Whitehorse and Jasper Printing Group, Edmonton.

Lofroth, E.C., and T. Mahon. 1993. Vertebrate fauna observed in the Tatshenshini Region of northwestern British Columbia. B.C. Ministry of Environment, Lands, and Parks, Smithers. 40 pp.

MacDougall, S, W. McCrory, and S. Herrero. 1997. A study of grizzly (*Ursus arctos*) and black bear (*Ursus americanus*) food habits and habitat use and a bear hazard assessment of the Rabbit Lake Area of Nahanni National Park Reserve, N.W.T. Canadian Heritage, Parks Canada. 157pp.

_____, M. Wall, F. Wall, and C. Wong. 1998. A grizzly bear risk assessment of campsites in the Slims Valley – Sheep Mountain area of Kluane National Park. Parks Canada, Prairie and Northern Region, Winnipeg. 86 pp.

MacHutchon, A.G. 1989. Spring and summer food habits of black bears in the Pelly River, Yukon. Northwest Science 63:116-118.

_____. 1996. Grizzly bear habitat use study, Ivvavik National Park, Yukon. Final Report. Western Arctic District, Parks Canada, Inuvik. 142 pp.

_____. 1998a. Grizzly bear habitat evaluation, Taku River Valley, B.C. Taku River Tlingit First Nation, Atlin. 11 pp.

_____. 1998b. Bear hazard evaluation at campsites on the Babine River, B.C. B.C. Ministry of Environment, Lands and Parks, BC Parks, Smithers. 44 pp.

_____, and S. Himmer. 1997. Bear hazard evaluation, Anhluut'ukwsim Laxmihl Angwinga'asanskwhl Nisga'a (Nisga'a Memorial Lava Bed Park). B.C. Ministry of Environment, Lands and Parks, BC Parks, Terrace. 54 pp.

_____, and B.L. Smith. 1990. Ecology, status and harvest of black bears (*Ursus americanus*) in the Yukon. Yukon Fish and Wildlife Branch, Whitehorse. 113 pp.

Mattson, D. J. 1990. Human impacts on bear habitat use. International Conference on Bear Research and Management 8:33-56.

McCann, R.K. 1994. Kluane National Park grizzly bear research project: year-end report-1993. Parks Canada, Kluane National Park and Reserve, Haines Junction. 43 pp.

_____. 1998. Kluane National Park grizzly bear research project. Interim final report to accompany the project review, October 21 & 22, 1998. Parks Canada, Kluane National Park and Reserve, Haines Junction. 128 pp.

McCullough, D.R. 1982. Behaviour, bears, and humans. Wildlife Society Bulletin 10:27-33.

McLellan, B.N. 1990. Relationships between human industrial activities and grizzly bears. International Conference on Bear Research and Management 8:57-64.

_____, and D.M. Shackleton. 1989. Immediate reactions of grizzly bears to human activities. Wildlife Society Bulletin 17:269-274.

Olson, T.L., and B.K. Gilbert. 1994. Variable impacts of people on brown bear use of an Alaskan River. International Conference on Bear Research and Management 9:97-106.

Pearson, A.M. 1975. The northern interior grizzly bear, *Ursus arctos* L. Canadian Wildlife Service Report No. 34. 86 pp.

Peepre, J.S., and Associates. 1992. Tatshenshini-Alsek Region wilderness study, British Columbia. Tatshenshini Wilderness Study Steering Committee, B.C. 112 pp.

Simpson, K. 1992. Tatshenshini wildlife habitat evaluation. B.C. Ministry of Environment, Lands and Parks, Smithers. 29 pp.

Warner, S. 1987. Visitor impact on brown bears, Admiralty Island, Alaska. International Conference on Bear Research and Management 7:377-382.

U.S.D.A. Forest Service. 1990. CEM - a model for assessing effects on grizzly bears. U.S.D.A. Forest Service, Region 1, Missoula, Montana. 24 pp.

Wellwood, D.W. 1997. Risk assessment of grizzly bear – human interactions at campsites on the Alsek River, Kluane National Park, Yukon. Parks Canada, Prairie and Northern Region, Winnipeg. 120 pp.

_____, and A.G. MacHutchon. 1999a. Risk assessment of bear – human conflict at campsites on the Alsek River, Kluane National Park, Yukon. Parks Canada, Kluane National Park and Reserve, Haines Junction. 64 pp.

_____, and _____. 1999b. Risk assessment of bear – human conflict at campsites on the Alsek River, Tatshenshini-Alsek Park, British Columbia. BC Parks, Skeena District, Smithers. 56 pp.

_____, and _____. 1999c. Risk assessment of bear – human interaction at campsites on the Alsek River, Kluane National Park, Yukon: addendum to July 1999 report. Parks Canada, Kluane National Park and Reserve, Haines Junction. 19 pp.

_____, and _____. 1999d. Risk assessment of bear-human interaction along the Cottonwood Trail, Kluane National Park, Yukon. Parks Canada, Kluane National Park and Reserve, Haines Junction. 62 pp.

_____, and _____. 1999e. Risk assessment of bear – human conflict along the Donjek Wilderness Route, Kluane National Park and Reserve, Yukon. Parks Canada, Kluane National Park and Reserve, Haines Junction. 34 pp.

_____, and _____. 2000. Risk assessment of bear – human interaction in the Mush & Bates Lakes area, Kluane National Park, Yukon. Parks Canada, Kluane National Park and Reserve, Haines Junction. 57 pp.

Yang, J.Y., and S. Graham. 1994. A study of the plant communities found along the Tatshenshini and Alsek rivers. BC Parks, Smithers. 46 pp.

Appendix 1. Bear food plant ratings at campsites along the Tatshenshini River and lower Alsek River, 1999.

Common Name	TY01	TY02	TY03	TY04	TK05	TK06	TT07	TT08	TT09	TT10	Trail-TT11	TT11	TT12	TT13	TT14
bearroot, sweet-vetch		M	L		L	L	L	L	L						
bluejoint						H					H				
clasping twistedstalk															
cow-parsnip			L				M-H				M				M
currant						M-H					H				
devil's club											M				M
field locoweed		L	M		L	L	L	L-M			H	H	L	L	
fireweed	M		L								H		H		
grasses			L			H	M								
highbush-cranberry			L	L	L	L				L-M	H	L-M	H	L	M
horsetail			L	L		H	H	M-H	M-H	M-H	L				H
kinnikinnick	H	L	L	L		L	L			L	H	M	L-M	L	
lady fern			H	L											
mountain-ash											M				
mountain sorrel															
northern ground-cone															
pacific hemlock-parsley															
prickly rose	M		L	L	L	L				M-H	H		H	L-M	
purple-leaved willowherb															
red currant						M									
red elderberry											L				L
red raspberry						M					H				
red-osier dogwood															L
salmonberry															
saskatoon											L		L		
sedges						M			L						
soapberry, soopolallie	H	L	H	H	M-H	H	M			M	H	H	H	L	L
stinging nettle															L
stink currant															L
strawberry															
sweet-cicely											L		L		L

willow														M-H

Appendix 1. Continued.

Common Name	TT15	TT16	TT17	TT18	TT19	TT20	TT21	TT22	TT23	AT110	AT111	AT112	AT113	AT114
bearroot, sweet-vetch		M	L							L	L-M	L-M	L-M	
bluejoint														
clasping twistedstalk														
cow-parsnip	L-M									L	L-M			
currant	H													
devil's club										M	H			
field locoweed	M-H	M	M	H	L-M	H	H	H	L	L	L-M	L-M	L-M	M-H
fireweed				L-M		L	L		M		L			L
grasses		L-M					M			M	L			
highbush-cranberry	H		L	M		M-H	M		H	L-M	M-H			
horsetail	M-H	H	L							L-M	L-M			
kinnikinnick				H		H	M	L	H	L-M	L	L	L	M
lady fern											L-M			
mountain-ash	M					L			L-M					
mountain sorrel														
northern ground-cone							M		L					
pacific hemlock-parsley														
prickly rose	M-H			L-M		M	L-M		H	L-M	L-M			
purple-leaved willowherb														
red currant										L-M				
red elderberry	L													
red raspberry										L				
red-osier dogwood	M-H			L					H	L	L			
salmonberry														
saskatoon						M	L-M		M	L-M	M			
sedges		L-M												
soapberry, soopolallie	H	L	M	H	L-M	M	M-H	M	M	L		L	L	M-H
stinging nettle	M													
stink currant														
strawberry														
sweet-cicely	L									L				

willow

Appendix 1. Continued.

Common Name	AG201	Trail-AG202	AG202a-c	AG202d	AG203	AG204	AG205	AG206a&b	AG207	AG208	AG209	AG210	AG211
bearroot, sweet-vetch			L				H	H		H		L	L
bluejoint													
clasping twistedstalk			L										
cow-parsnip	M-H		H		L				M-H	L	L		M-H
currant	L-M												
devil's club	L		M		L				M		L		
field locoweed	L	M-H	H	L	L	L	M					M	L
fireweed	M												
grasses	M		M	M		L	H		H	M	M-H	L	H
highbush-cranberry													L-M
horsetail	L-M	L	M		L-M	L	L	L	L	L	M-H		
kinnikinnick													
lady fern	M				L				L				L-M
mountain-ash													
mountain sorrel	H												
northern ground-cone			H		L-M	L			M	L-M		L	M-H
pacific hemlock-parsley	L												
prickly rose													
purple-leaved willowherb	L								L				
red currant													
red elderberry	L				L				M				
red raspberry													
red-osier dogwood													
salmonberry	L-M					L			L-M				
saskatoon													
sedges	H		M		L		M			L			
soapberry, soopolallie	L												
stinging nettle													
stink currant	L								H				
strawberry							L-M	L	L	L	M	L	H

sweet-cicely	M		L	M
willow	M	L-M		

Appendix 2. Individual campsite assessments along the Tatshenshini River and lower Alsek River, 1999.

TY01 – Shaw'ashe/Dalton Post Put-in, Yukon

Highest Displacement Concern: **Late Summer – Moderate to High**
Highest Encounter Concern: **Late Summer – High**
Campsite Description: Frequent-use campsite. Mixed white spruce and balsam polar forest with road openings and an opening for camping cut from the forest. Dense understory of soapberry, kinnikinnick, some prickly rose, patches of fireweed, and common juniper. Numerous fire rings.
Seasonal Habitat Potential
Spring: L-M Summer: M-H Late Summer: H
Bear Travel Concerns – High. Salmon in the area, good soapberry patches, travel to the Klukshu weir.
Visibility Concerns – High. Surrounded by forest or shrubs.
Other Sensory Concerns – Low. River is quiet here.
Bear Animal Foods – Salmon carcasses in eddies.
Bear Sign – Two vegetation/horsetail scats on road; several well used human/wildlife trails in the area.

TY02 – Gravel bar above Village Creek, Yukon

Highest Displacement Concern: **Late Summer – Moderate**
Highest Encounter Concern: **Late Summer – Moderate**
Campsite Description: Frequent-use campsite.
Seasonal Habitat Potential
Spring: L-M Summer: L Late Summer: M
Bear Travel Concerns – Moderate.
Visibility Concerns – Low.
Other Sensory Concerns – Low.
Bear Animal Foods – Salmon that have possibly washed into eddy; lots of bear tracks on sand bar. Salmon fry in back channels. Winter moose sign and calf track. Ants in old logs and under rocks; old and fresh logs pulled apart.
Bear Sign – Tracks from five bears (four adults and one yearling) along beach. Several older bearroot digs on gravel bar; holes that may be old digs. Logs pulled apart - one at kitchen area, one on gravel bar to south behind alder and one southwest of camp. Cranberry/soapberry scat. Potential salmon season beds in gravel bar.

TY03 – Squaw Creek Mouth, Yukon

Highest Displacement Concern: **Late Summer – Moderate to High**
Highest Encounter Concern: **Late Summer – Moderate to High**
Campsite Description: Frequent-use campsite. Lots of very weathered boards in back channel debris as well as sawn logs. Series of old back channels - mostly dry to moist with

horsetail and grasses, turning to thick alder and willow upstream. Good trail runs along first bench in forest, becoming a maze of trails upstream.

Seasonal Habitat Potential

Spring: L Summer: L-M Late Summer: H

Bear Travel Concerns – Moderate. Steep hill across river. Bears could be funnelled from canyon above. Trail and road along Squaw Creek lead to camp. Not easy movement in thick shrubs on flats.

Visibility Concerns – Moderate. However, more confined than TY02.

Other Sensory Concerns – Moderate. River noise relatively high.

Bear Animal Foods – Old winter and spring moose scats. Ants - older logs torn apart.

Bear Sign – Old tracks worn into sand/mud. Horsetail and crowberry scat (dark with very small oval seeds, approximately one week old); soapberry scat (with small amount of crowberry). Grizzly bear hair. Older 17cm tracks along active back channel; female and yearling tracks before last rain. Trail along creek; mark tree.

TY04 – Upstream side of Silver Creek, Yukon

Highest Displacement Concern: **Late Summer – Moderate to High**

Highest Encounter Concern: **Late Summer – Moderate to High**

Campsite Description: Frequent-use campsite. Lots of evidence of former hunting/mining camps along creek.

Seasonal Habitat Potential

Spring: L Summer: L Late Summer: H

Bear Travel Concerns – Low.

Visibility Concerns – Moderate. Low on cobble bar; high in poplar forest.

Other Sensory Concerns – Low.

Bear Animal Foods – Lots of winter moose sign. Old beaver sign - lots of chewed poplar. Ants and larvae under rocks. Lots of logs and ant mounds torn apart; huge flat mounds in area (2-3m in diameter) with small black ants. Wolf or coyote scat in ant mound dig.

Bear Sign – One scat with small bear claw; another bear or wolf scat full of what looks like bear hair. Devil's club scat from last year. Fresh 13.5cm track going up Silver Creek; older 15cm tracks. Major bear and moose trail near top of Silver Creek fan cutting diagonally to Tatshenshini upstream through forest; good trail leads up Silver Creek as well. Black bear seen crossing river from right side to left side downstream of Silver Creek.

TK05 – Downstream side of Silver Creek, Kluane National Park

Highest Displacement Concern: **Late Summer – Moderate**

Highest Encounter Concern: **Late Summer – Moderate**

Campsite Description: Frequent-use campsite. Four tent sites are in high soapberry shrub cover in first clump of cottonwoods from river/creek junction. Old outhouse and stovepipes - signs of hunting camp, but possibly used by rafters. Very heavily used site; first night for most rafting groups. Pretty good site overall provided people stay in the open.

Seasonal Habitat Potential

Spring: L Summer: L Late Summer: M-H

Bear Travel Concerns – Moderate. Two creeks come together. Lots of alternatives for travel, but good route.

Visibility Concerns – Low. Open site, unless people are camped back in poplar opening. Camping use mostly confined to river's edge.

Other Sensory Concerns – Low. River noise not too bad.

Bear Animal Foods – Low amounts of moose and ant sign.

Bear Sign – Black bear seen swimming across river from below Silver Creek camp to left side of river.

TK06a – Upstream side of Bridge Creek, Kluane National Park

Highest Displacement Concern: **Late Summer – Moderate**

Highest Encounter Concern: **Spring, Summer and Late Summer – Moderate**

Campsite Description: Frequent-use campsite. Sawed fire wood, tent spots. Large beaver pond complex northeast of creek behind campsite through poplar stand; lots of common horsetail and some palatable sedges and grasses. Fresh wolf tracks in back channel. One eagle's nest in beaver pond area; another (with one nearly fledgling-aged young) in forest downstream of Bridge Creek on right side of river.

Seasonal Habitat Potential

Spring: H Summer: M Late Summer: M-H

Bear Travel Concerns – Moderate. Two creeks come together; however, lots of travel options.

Visibility Concerns – High. Closed-in camping area.

Other Sensory Concerns – Moderate. Creek and river noise.

Bear Animal Foods – Ants - couple of logs pulled apart. Lots of moose sign; lots of tracks in beaver pond area

Bear Sign – Grizzly bear tracks on sand bar. Lots of grizzly and black bear tracks in sand and mud near poplar stand on downstream side. Major bear and moose trail 300 m up from river toward beaver pond

TK06b – Downstream side of Bridge Creek, Kluane National Park

Highest Displacement Concern: **Late Summer – Low to Moderate**

Highest Encounter Concern: **Late Summer – Low to Moderate**

Campsite Description: Same as TK06 a. Frequent-use campsite.

Seasonal Habitat Potential

Spring: L Summer: L Late Summer: M

Bear Travel Concerns – Moderate. Two creeks come together; however, lots of travel options.

Visibility Concerns – Low.

Other Sensory Concerns – Moderate. Creek and river noise.

Bear Animal Foods – Same as TK06 a.

Bear Sign – Same as TK06 b.

TT07 – 2-3 km upstream of Quiet Canyon below Bridge River, Tatshenshini-Alsek Park

Highest Displacement Concern: **Spring and Summer – Moderate**
Highest Encounter Concern: **Spring, Summer and Late Summer – Moderate**
Campsite Description: Frequent-use campsite. Large group used site recently. A good alternative site to Silver Creek or Bridge River; nice view, good tenting/kitchen area. Only problem is there is no water.
Seasonal Habitat Potential
Spring: H Summer: M-H Late Summer: M
Bear Travel Concerns – Low. Lots of alternate travel routes; trails probably in poplar stand. Narrow gravel bar possibly used by bears when travelling.
Visibility Concerns – Moderate. Moderate for kitchen area; nice and open, but narrow, linear site. Low for tents on gravel bar; high for tents in poplar.
Other Sensory Concerns – Low. River is not very noisy here.
Bear Animal Foods – Moose tracks and scat; evidence of browsing. Ants - under logs; one large log rolled over.
Bear Sign – Grizzly bear seen upstream with mouth full of horsetail. Several sets of grizzly bear and black bear tracks (17.5 cm and 13 cm) on gravel/sand bar. One week-old feeding on cow-parsnip. Two older common horsetail scats. Mark trail into willows at upper end of gravel bar (five to six steps only - possibly more but faint). One dried horsetail scat.

TT08 – Cliff face between Quiet Canyon and Detour Creek, Tatshenshini-Alsek Park

Highest Displacement Concern: **Spring, Summer and Late Summer – Moderate**
Highest Encounter Concern: **Spring, Summer and Late Summer – Low to Moderate**
Campsite Description: Low-use campsite. Eagle, lynx, and wolf tracks on sand bar.
Seasonal Habitat Potential
Spring: M-H Summer: M-H Late Summer: M
Bear Travel Concerns – Moderate. Funnelled to edge of cliff and either swim across or up and around back side.
Visibility Concerns – Low.
Other Sensory Concerns – Low. Little noise from river.
Bear Animal Foods –
Bear Sign – Numerous grizzly bear tracks of various sizes on bar - probably five different bears. Recent dig in sand near point.

TT09 – Mouth of Detour Creek back channel outlet, Tatshenshini-Alsek Park

Highest Displacement Concern: **Spring and Summer – Low to Moderate**
Highest Encounter Concern: **Spring, Summer and Late Summer – Low**

General Description: Low-use campsite. Sand/gravel bar across Tatshenshini from Detour Creek outlet. Footprints and possible kitchen area; may be just a lunch spot. Poplar forest behind with common horsetail and patch of sedges; good horsetail on fringe and then peters out in forest. Good site for minimal disturbance.
Seasonal Habitat Potential
Spring: M Summer: M Late Summer: L-M
Bear Travel Concerns – Low.
Visibility Concerns – Low.
Other Sensory Concerns – Low. River pretty quiet.
Bear Animal Foods –
Bear Sign – Two sets of bear tracks.

TT10 – Upstream of Bear Bite Creek, Tatshenshini-Alsek Park

Highest Displacement Concern: **Spring and Summer – Low to Moderate**
Highest Encounter Concern: **Spring and Summer – Low to Moderate**
General Description: Frequent-use campsite. Well-used site that is similar-looking to Sediments Creek; people may think it is Sediments Creek. BC Parks calls the site "Bear Bite Creek" because, apparently, a woman was bitten through her tent by a bear here. Large mountain-avens flats beside multi-braided creek. Surrounded by poplar on two sides. Abundant northern sweet-vetch on mountain-avens bench, but also in poplar/alder stand; first I have seen at campsite; quite prolific.
Seasonal Habitat Potential
Spring: M-H Summer: M-H Late Summer: M
Bear Travel Concerns – Moderate. Trail along river leads to camp. Traffic down the creek, likely at the edge of the poplar.
Visibility Concerns – Moderate. Blocked on one side; otherwise, quite good.
Other Sensory Concerns – Moderate. Creek noise somewhat louder here with rushing water at mouth of creek.
Bear Animal Foods – Ants - under rocks and a few old logs; one rock rolled over.
Bear Sign – Small grizzly bear tracks along creek; one unknown track near tent. Wildlife trails along creek and parallel to river.

Sediments Creek Trail to Grass Knoll

Highest Displacement Concern: **Spring – High**
Highest Encounter Concern: **Summer and Late Summer – High**
General Description: Trail goes through good habitat all the way except open mountain-avens flats. Bears in area may not be displaced to same extent as elsewhere because they have become used to human traffic. Hikers should remain in open flats, avoid hiking in early morning or late evening, travel in groups and make lots of noise. North side of grass slope is rich in bear foods such as devil's club, red currant, red raspberry, and mountain-ash.
Seasonal Habitat Potential
Spring: H Summer: H Late Summer: H

Bear Travel Concerns – High.
Visibility Concerns – High. Visibility is poor in forest.
Other Sensory Concerns – Moderate. Wind in aspen and on slope; prevailing from south.
Bear Animal Foods – Several ground squirrels on dry, grassy slopes.
Bear Sign – Six mark tree sites including those at base of slope off trail (three in forest and three at base of slope). Couple of probable mark trails. Scat along trails - possibly field locoweed/other vegetation.

TT11 – Upstream side of Sediments Creek, Tatshenshini-Alsek Park

Highest Displacement Concern: **Summer and Late Summer – Moderate**
Highest Encounter Concern: **Late Summer – Moderate**
General Description: Frequent-use campsite. Main camp at mouth of creek. Few foods within 150m; however, higher risk over by fresh water source and secondary use area at edge of poplar/aspen stand. Possibly some camping also right in thick soapberry site. Likely some groups row or drag boats up back channel to fresh water source coming out of wetland.
Seasonal Habitat Potential
Spring: L Summer: M-H Late Summer: M-H
Bear Travel Concerns – Moderate. Accesses high value habitat. Two creeks join; harder travel on the other side.
Visibility Concerns – Low. Unless tent near forest; not recommended.
Other Sensory Concerns – Moderate. Winds up valley; poplar leaves shaking. Some river noise.
Bear Animal Foods – Ants - rocks rolled; perhaps shallow digs.
Bear Sign – Mark tree right by main camp. Many shallow digs in field locoweed and goldenrod flats, but not sure for what. No bearroot present. Ants associated with many of the digs - digging for larva? Rocks rolled. Common horsetail scats in field locoweed flats. Black bear seen feeding on soapberry in poplar stand.

TT12 – Downstream side of Sediments Creek, Tatshenshini-Alsek Park

Highest Displacement Concern: **Late Summer – High**
Highest Encounter Concern: **Late Summer – High**
General Description: Frequent-use campsite just downstream of creek outlet. Two probable kitchen areas. Lots of tent pads and trails within open poplar/soapberry flats that go back a fair distance along edge of gravel bar. Gyrfalcon dive-bombing an immature eagle.
Seasonal Habitat Potential
Spring: L-M Summer: L-M Late Summer: H
Bear Travel Concerns – Moderate. Some choice of routing, but many trails lead to camp.
Visibility Concerns – High. Much more confined site, particularly around kitchen/tent areas.
Other Sensory Concerns – Moderate. Prevailing wind upstream; noisy creek.
Bear Animal Foods –

Bear Sign – Large 18 cm recent grizzly bear tracks through tent site; small grizzly bear tracks near kitchen; another recent track in tent area. Trail leads up creek to mountain-avens flats; movements through forest stand behind camp. Soapberry feeding near tent area. Scats: one dried soapberry/horsetail; one more recent soapberry/cow-parsnip; one soapberry/cow-parsnip; two common horsetail/soapberry.

TT13 – Upstream side of Alkie Creek mouth, Tatshenshini-Alsek Park

Highest Displacement Concern: Spring, Summer and Late Summer – Low
Highest Encounter Concern: Spring and Summer – Low to Moderate
General Description: Frequent-use campsite. Large mountain-avens flat at mouth of Alkie Creek. Site is just upstream of river mouth.
Seasonal Habitat Potential
Spring: L Summer: L Late Summer: L
Bear Travel Concerns – Low. Wide, open spaces; if travel, probably along forest edge.
Visibility Concerns – Moderate. Blocked on one side from the kitchen; otherwise, quite open.
Other Sensory Concerns – Moderate. Alkie Creek is loud; can hear boulders rolling. Prevailing winds upstream.
Bear Animal Foods – Ants under rocks, in logs and in sand.
Bear Sign – Large grizzly bear tracks in mud at edge of forest island; grizzly bear tracks below and behind white spruce and by Alkie Creek; one older, smaller grizzly bear track. Wildlife trail on far side (up Alkie Creek) of white spruce forest patch; wraps around near Alkie Creek. One rock rolled.

TT14 – Downstream side of O'Connor River, Tatshenshini-Alsek Park

Highest Displacement Concern: **Spring – Moderate to High**
Highest Encounter Concern: **Spring, Summer and Late Summer – Moderate to High**
General Description: Frequent-use campsite strung out along edge of poplars and below cliff face. Hundreds of grasshoppers in this area this year. Concerns when people go for water and hike back into thick shrub cover. Should also not tent in thick shrub cover; alternatively, should tent in open as much as possible given winds, etc. Much richer habitat on hillside and at base; lots of plant foods. Few foods on flats. Five eagles perched on cliff behind clear creek.
Seasonal Habitat Potential
Spring: M-H Summer: M-H Late Summer: M
Bear Travel Concerns – High. Bears funnelled between rock ridge and main river, if on this side; steeper rock ridge on far shore. Travel corridor.
Visibility Concerns – High.
Other Sensory Concerns – Moderate. Noise from river; wind coming up the valley.
Bear Animal Foods – Are salmon spawning in stream channel? Good ground water source. Lots of winter moose sign.
Bear Sign – Old field locoweed scat; common horsetail scat near boat area. Wildlife trail near creek. Large male grizzly bear tracks seen earlier on O'Connor River fan.

TT15 – Across from Henshi Creek fan, Tatshenshini-Alsek Park

Highest Displacement Concern: **Summer and Late Summer – Moderate to High**
Highest Encounter Concern: **Summer and Late Summer – High**
General Description: Frequent-use campsite. Lots of flooded parts of bar. River level has come up quite a bit in last few days with sunshine. We pulled out on gravel bar downstream of another bench; tent rings on gravel bar. Second kitchen/tent area upstream. Not a recommended site.
Seasonal Habitat Potential
Spring: M-H Summer: H Late Summer: H
Bear Travel Concerns – High. Trails right through site.
Visibility Concerns – High. Second kitchen/tent area especially.
Other Sensory Concerns – High. River loud in this section; prevailing winds upstream - leaves trembling on poplar.
Bear Animal Foods – Moose bones with grizzly bear hair; wolf kill?
Bear Sign – Black bear came out on channel as we were getting ready to go; watched us for a while then ambled off. Soapberry feeding sign near second kitchen area. Scats: 1 devil's club/soapberry/cow-parsnip; 100% soapberry; 2 field locoweed; 1 devil's club/horsetail. Two sets of grizzly bear tracks in mud. Trails in forested bench and in flats between two kitchen sites. Grizzly bear hair on branch along trail. One poplar mark tree on flats trails at end of the camp; three white spruce mark trees on bench above second camp area.

TT16 – Downstream side of Henshi Creek up against cliff face, Tatshenshini-Alsek Park

Highest Displacement Concern: **Spring and Summer – Moderate**
Highest Encounter Concern: **Spring and Summer – Moderate**
General Description: Low-use campsite. Small site up against cliff face that Gord MacRae has used. Not sure if other groups would use or not; probably not large commercial group. Fast eddy to get out, but not too bad. Lose sun early. Did not check out forest which is 250-300m away; probably like TT15 site forest.
Seasonal Habitat Potential
Spring: M-H Summer: M-H Late Summer: L-M
Bear Travel Concerns – Moderate. Large rock wall behind site. Bears may use bar to cross river or this is a dead end.
Visibility Concerns – Moderate. Closed in a fair amount in poplar/tent area.
Other Sensory Concerns – Moderate. Noise of river; winds upstream.
Bear Animal Foods – Chinook fry in back channel; second year?
Bear Sign – Several sets of grizzly bear tracks in kitchen area. Bearroot digs on bar. Trail along back channel on camp side.

TT17 – Tats Creek mouth, Tatshenshini-Alsek Park

Highest Displacement Concern: **Spring, Summer and Late Summer – Moderate**
Highest Encounter Concern: **Spring, Summer and Late Summer – High**

General Description: Frequent-use campsite. Small site at mouth of Tats Creek. Recent use; perhaps private group. If there was a bigger site here before it has been washed away partly. Not much room for tents. Likely major travel intersection of bears moving out of Tats Creek. Looks like good side slope habitat up Tats Creek.
Seasonal Habitat Potential
Spring: L-M Summer: M Late Summer: M
Bear Travel Concerns – High. Travel corridor near; bears coming out of Tats Creek.
Visibility Concerns – High. Surrounded by poplar/alder.
Other Sensory Concerns – High. Creek noise; protected from wind.
Bear Animal Foods – Low amount of ants.
Bear Sign – Grizzly bear seen on fan of Tomanhous Creek; eventually crossed to this side. Appears a bear may have been digging in gravel at kitchen area, but no tracks at spot; one bearroot dig. Several sets of grizzly bear tracks near kitchen and elsewhere on flats - as many as ten. Good wildlife trail along flats. Old soapberry scat; one devil's club/currant/unknown scat near camp.

TT18 – Downstream side of Towagh Creek, Tatshenshini-Alsek Park

Highest Displacement Concern: **Summer and Late Summer – Moderate to High**
Highest Encounter Concern: **Summer – High**
General Description: Frequent-use campsite. Large group site; heavy use. Fan of Towagh Creek. Problems with location of tent area and accessibility of field locoweed in summer and soapberry in late summer. Also concern with hiking away from tent/kitchen area and trail to water hole behind tent area. Should camp more on fan.
Seasonal Habitat Potential
Spring: M-H Summer: H Late Summer: H
Bear Travel Concerns – Moderate. Towagh Creek.
Visibility Concerns – Moderate. Worst back in tent area; water hole; undulating terrain.
Other Sensory Concerns – Moderate. Noise from river; wind at times. River noise reduced behind shrub cover.
Bear Animal Foods – Some ants.
Bear Sign – Possibly locoweed dug up. Two sets of tracks. Soapberry feeding. Rocks rolled.

TT19 – Large gravel bar upstream of Ninetyeighter Creek, Tatshenshini-Alsek Park

Highest Displacement Concern: **Spring, Summer and Late Summer – Low**
Highest Encounter Concern: **Spring, Summer and Late Summer – Low to Moderate**
General Description: Low-use campsite. Large gravel and sand bar with few bear foods. Mostly open poplar/alder with lots of northern sweet-vetch.
Seasonal Habitat Potential
Spring: L Summer: L Late Summer: L
Bear Travel Concerns – Moderate. Travel on edge of gravel bar and side channel; tracks all over bar, however.

Visibility Concerns – Moderate. Side closed in by alders, but bar visible when not at camp.
Other Sensory Concerns – High. River noisy (big water) and prevailing wind upstream.
Bear Animal Foods – Lots of ants.
Bear Sign – Lots of grizzly and black bear tracks on bar. Wildlife trail that parallels the back channel of the gravel bar up against the trees. Two balsam poplar mark trees with mark trail where sand meets forest at river. Another trail goes upstream through alder fringe. Scats: common horsetail; locoweed; locoweed/black bear hair.

TT20 – Mouth of Ninetyeighter Creek, Tatshenshini-Alsek Park

Highest Displacement Concern: **Summer and Late Summer – Moderate**
Highest Encounter Concern: **Summer and Late Summer – Moderate to High**
General Description: Frequent-use (moderate use) campsite. No firewood, tracks of numerous people, not too much trampling. Open creek bottom; raised sandy benches.
Seasonal Habitat Potential
Spring: M Summer: H Late Summer: M-H
Bear Travel Concerns – High. Very well-used trail goes right across fan.
Visibility Concerns – Moderate. Quite open site.
Other Sensory Concerns – Moderate. Noise from river.
Bear Animal Foods – Ants dug out of ground and some logs.
Bear Sign – Recent field locoweed root diggings. Lots of grizzly bear tracks all over the fan. Very well-used wildlife/bear trail right across fan; most use on west side. Scats: older common horsetail/unknown vegetation; older cow-parsnip/unknown vegetation; two old field locoweed.

TT21 – Upstream side of Melt Creek, Tatshenshini-Alsek Park

Highest Displacement Concern: **Summer – Moderate to High**
Highest Encounter Concern: **Summer and Late Summer – High**
General Description: Frequent-use campsite. Few choices for tent sites because of big cobbles. Spruce/poplar forest to southeast with shrub moss understory and increased coastal plants in openings. Major bear movements along silt, dry back channel; also people travelling at least 400 m upstream along same movement area.
Seasonal Habitat Potential
Spring: L Summer: H Late Summer: M-H
Bear Travel Concerns – High. Trails converge at site; several trails in area.
Visibility Concerns – High. Some screening and undulation; vegetation fairly open.
Other Sensory Concerns – Moderate. Creek and river noise.
Bear Animal Foods – Ants under rocks.
Bear Sign – Three field locoweed scats. Female grizzly bear and yearling out on river channel looking for something (fish?); disturbed by something and ran off. On June 19th or 20th, Gordon MacRae and CRE group saw 3-4 year old grizzly bear grazing on locoweed flowers 40-50 m away from them just behind campsite. Trail along Melt Creek. Grizzly bear track on trail. Rock rolled and log pulled apart. Digs in northern ground-cone.

TT22 – Downstream side of Melt Creek, Tatshenshini-Alsek Park

Highest Displacement Concern: **Summer – Moderate to High**
Highest Encounter Concern: **Summer – Moderate to High**
General Description: This is the large group, frequent use site at Melt Creek. One main site and two additional use areas across tributary channel of Melt Creek. Trails away from camp have heavy use by humans, especially along river. Tent sites are probably chosen for views of confluence right on river bank.
Seasonal Habitat Potential
Spring: L Summer: H Late Summer: M
Bear Travel Concerns – Moderate. Some trails, but mostly human; one well-used mark trail along bench southwest of site.
Visibility Concerns – High. Especially around kitchen and near tent sites.
Other Sensory Concerns – Low. Unless wind blowing strongly.
Bear Animal Foods – Ants - rocks rolled over and logs torn apart.
Bear Sign – Bed 150-m southwest of kitchen. Female grizzly bear and yearling in river channels toward Petroglyph Island when we were at upstream site. One set of grizzly bear tracks on top of very recent human tracks; two sets in creek mud. Poplar mark tree and trail with 109 pad marks. Scat: locoweed; recent devil's club/soapberry; three by bed SW of camp (soapberry/devil's club/field locoweed flower and seed); 1 unidentified berry. At least five field locoweed roots dug and eaten. Probably travel route along bench southwest of camp.

TT23 – Petroglyph Island/ Tat Island, Tatshenshini-Alsek Park

Highest Displacement Concern: **Late Summer – Low to Moderate**
Highest Encounter Concern: **Spring, Summer and Late Summer – Low to Moderate**
General Description: Frequent-use campsite at the edge of the island on the north side. Harder to get to now because channels on east side do not have much water. Trail up centre of island to petroglyphs on rock outcrop.
Seasonal Habitat Potential
Spring: L-M Summer: L-M Late Summer: H
Bear Travel Concerns – Moderate. Intersection of Tatshenshini and Alsek.
Visibility Concerns – Low. Low in camp, but moderate on trail.
Other Sensory Concerns – Moderate. Camp - wind. Moderate on trail.
Bear Animal Foods –
Bear Sign – Female and yearling seen earlier just upstream of island. Some bear trails. Several grizzly bear tracks on sand bar on northwest side of island. Field locoweed flower scat at petroglyphs.

AT110 – Reynolds Glacier Creek, Tatshenshini-Alsek Park

Highest Displacement Concern: Late Summer – Low to Moderate
Highest Encounter Concern: Late Summer – Moderate
General Description – Frequent use campsite. This campsite has been used on a regular basis by at least two commercial groups. Recently, the extensively braided creek washed out part of

the campsite. At the time of our assessment this campsite was usable although apparently not as desirable as it has been in the past. Future changes in channel flow may make this campsite more or less desirable for camping. The campsite is on an extensively braided creek where most of the floodplain vegetation is in early succession. There is a rock out crop on the downstream side of the campsite that has dry site species such as rose and saskatoon and wet seepage species such as highbush-cranberry, devil's club, false lily of the valley, mountain ash, sweet cicely, foam flower (*Tiarella unifoliata*) and goat's beard (*Aruncus dioicus*). At the base of the outcrop there is a pocket of horsetail.

Seasonal Habitat Potential

Spring: L Summer: M-L Late Summer: M

Bear Travel Concerns – Moderate. The sloping terrain and the relative ease of travel down the creek may funnel bears through the campsite but bears have alternatives to avoid the campsite if they detect people.

Visibility Concerns – Moderate. The campsite area is open but visibility is obstructed on the downstream side by the rock outcrop.

Other Sensory Concerns – Moderate. Winds (people walking up the creek will likely be walking into prevailing winds)

Bear Animal Foods –

Bear Sign –grizzly bear tracks – few sets on gravel bar; 2 scats on creek bed

AT111 – Netland Glacier View – Rock Outcrop, Tatshenshini-Alsek Park

Highest Displacement Concern: **Summer & Late Summer – Moderate**

Highest Encounter Concern: **Late Summer – Moderate – High**

General Description: This frequently used campsite is likely desirable to rafters because there is shelter from the wind and a spectacular view of the Netland Glacier. The campsite is beside a short back channel that may be dry at low water levels. The campsite is in a sheltered 'alcove' that is backed by a steep mountain slope and bordered upstream and downstream by rock ridges. There is a relatively large area over which people can camp. The area around the campsite has patches of tall shrub balsam poplar and patches of willow, alder and soapberry. Herbs in the area include locoweed, horsetail, mountain-avens, and bearroot. At the base of the slope there is a wet sandy strip with willow and horsetail. Behind the wet strip there is a wide slope of large balsam poplar trees with an under story mixed with devil's club, alder, goat's beard, baneberry (*Actaea rubra*), red currant, sweet cicely, cow parsnip, highbush-cranberry and red-osier dogwood. The rock outcrop on the downstream side of the campsite is dry, similar to the outcrop at AT110, with highbush-cranberry, saskatoon, rose, kinnikinnick and grasses with patches of devil's club and ferns.

Seasonal Habitat Potential

Spring: L-M Summer: M Late Summer: H

Bear Travel Concerns – High. Bears maybe funnelled through the campsite by the terrain and the relative ease of travel across open areas. Bears have alternatives to avoid the campsite if they detect people.

Visibility Concerns – Moderate; visibility concerns are lower in some areas than others.

Other Sensory Concerns – Moderate; winds
Bear Sign – grizzly bear and black bear tracks – numerous in sandy areas; >8 scats; broken trails in the poplar/devil's club stand and a trail that starts at the head of the slough and goes on to the rock ridge

AT112 & AT113 – Island Campsites, Tatshenshini-Alsek Park

Highest Encounter Concern: **Summer & Late Summer – Low – Moderate**
Highest Displacement Concern: **Spring, Summer & Late Summer – Low**
General Description: Frequent-use campsites. There are at least two sites where people are likely to camp in this area. Campsite AT112 is on an island beside the main stem of the Alsek River and at the base of a rock outcrop. Campsite AT113 is between Campsite AT112 and the mainland and must be accessed through a small side channel. Access to Campsite AT113 may be restricted if water levels are low. Both of these campsites are floodplains with sparse vegetation. There is a fringe of balsam poplar at the inland campsite (Campsite AT113). Habitat potential on the mountain slope further inland was not investigated. However, habitat quality is likely to be relatively high similar to mountain slope by Campsite AT111.
Seasonal Habitat Potential (Campsite AT112/Campsite AT113)
Spring: L/L Summer: L-M/M Late Summer: L-M/M
Bear Travel Concerns – Low; bears have alternatives to avoid the campsite if they detect people.
Visibility Concerns – Low
Other Sensory Concerns – Moderate; wind
Bear Sign – grizzly bear and black bear tracks, several at both sites; 1 scat; several fresh and old bearroot diggings

AT114 (Field # ATA) – Across from Reynolds Glacier mouth, Tatshenshini-Alsek Park

Highest Displacement Concern: **Summer and Late Summer – Moderate**
Highest Encounter Concern: **Summer and Late Summer – Moderate**
General Description: Found site by chance, but a well-used site. Lousy eddy at the higher water levels we have now. Channels have changed a lot so it may have been better before. Poplar/mountain-avens bench with fair amount of soapberry and field locoweed. Uniform habitat on bench with variation in soapberry, field locoweed and kinnikinnick abundant.
Seasonal Habitat Potential
Spring: L Summer: M-H Late Summer: M-H
Bear Travel Concerns – Moderate. Trail through camp, but have choice to go around.
Visibility Concerns – Moderate. Alternate open and fairly dense poplar around site.
Other Sensory Concerns – Moderate. River noise; sheltered, but could be windy.
Bear Animal Foods – Ants - under logs and rocks.
Bear Sign – Trail through camp. Mark tree west of kitchen area. Scat: two old field locoweed flower/grass; one small fresh soapberry/root fibre (possibly field locoweed); one older soapberry.

AG201 (Field # AGB) – Upstream of corner to Walker Glacier, Glacier Bay National Park

Highest Displacement Concern: **Summer – Moderate to High**
Highest Encounter Concern: **Summer and Late Summer – Moderate to High**
General Description: Frequent-use campsite. Small group site below steep talus/avalanche slope. Some movement through and feeding likely good at this site. Some question as to whether this spot is start of 'border hike'. We saw no sign of hiking on border right of way. Talus could be hiked here to ridge line, but only by experienced hikers.
Seasonal Habitat Potential
Spring: L-M Summer: H Late Summer: M-H
Bear Travel Concerns – Moderate. Likely movement onto bar; steep walking downstream on this side.
Visibility Concerns – Moderate; some blockage by shrub cover; fairly open.
Other Sensory Concerns – Moderate; river noise is not too bad.
Bear Animal Foods – Ants.
Bear Sign – Grizzly bear tracks in sand. Log pulled apart; field locoweed and grass fed on. Two common horsetail scats on bar; two other field locoweed scats.

AG202 (Field # AGC) – Walker Glacier Trail, Glacier Bay National Park

General Description: Well-used trail leading from use site 1 across undulating terrain and through alder/poplar patches and through field locoweed patches. Routed through alternately open and scattered clumps of alder/willow. Several bad visibility spots in thick alder. Poor visibility in general. Two to four well-used trails follow along moraines on north side of the lake. Difficult to rate trails because there are several trails leading from the different sites. Nevertheless, the worst trail is from first use site in terms of food availability, poor visibility, and number of bear scats. It would be better to have one trail along moraines than through shrub area; that means cutting across flats from first and second use sites. Perhaps a cairn trail to glacier via the moraines rather than have hikers walk through alders/willows or to disperse from campsites.
Bear Sign – Four northern ground-cone scats near trail from use site 1; another along one of the moraine trails.

AG202, sub-sites a-c (Field # AGC a-c) – Walker Glacier, Glacier Bay National Park

Highest Displacement Concern: **Summer and Late Summer – Moderate**
Highest Encounter Concern: **Summer and Late Summer – Moderate**
General Description: Multiple group, heavy use site stretching all along shoreline from large bay around to base of moraine. Three main use areas. Northern sweet-vetch, cow-parsnip and some field locoweed in flower; devil's club berries green. Phenology is behind here, likely because of cold air from the glacier. Keep human use areas predictable to bears.
Seasonal Habitat Potential
Spring: L-M Summer: H Late Summer: M-H

Bear Travel Concerns – Moderate. Third use area: bears might funnel through to cross the lake mouth. First use area is a problem if bears follow the shoreline of the bay. This is the best travel side of the river for bears.
Visibility Concerns – Moderate; high at first site; low at sites 2 and 3.
Other Sensory Concerns – Moderate; some river, wind, glacier and rock noise.
Bear Animal Foods – Marmots heard whistling in talus slopes to east. Moose sign.
Bear Sign – Observed bear sign was dispersed in openings and on moraine. Feeding on cow-parsnip; northern ground-cone dug up. Two old field locoweed and three old, possibly, northern ground-cone scats. Bear bedded on the edge of a moraine; dropped large pies of possible northern ground-cone scat. Feeding on locoweed flowers. Three locoweed and one old common horsetail scat. Numerous sets of tracks.

AG202, sub-site d (Field # AGCd) – Below lake at Walker Glacier, Glacier Bay National Park

Highest Displacement Concern: **Spring, Summer & Late Summer – Low to Moderate**
Highest Encounter Concern: **Spring, Summer & Late Summer – Moderate**
General Description: Small use area; especially now that water levels are high and channel at site is flooded.
Seasonal Habitat Potential
Spring: L Summer: L Late Summer: L
Bear Travel Concerns – Moderate. Probably use next strip of land for moving past lake, but could come by here.
Visibility Concerns – Moderate; some blocked vision.
Other Sensory Concerns – Moderate; river noise, possibly wind at times.
Bear Animal Foods –
Bear Sign – One set of old tracks.

AG203 (Field # AGD) – Below standing waves upstream of Novatak Glacier ('Purple Haze'?), Glacier Bay National Park

Highest Displacement Concern: **Spring, Summer and Late Summer – Low**
Highest Encounter Concern: **Spring, Summer and Late Summer – Low to Moderate**
General Description: Not a frequently-used site; certainly not used recently. Two potential use areas that Ramona treated as one campsite. Mostly hard packed gravel substrate with moss growing on it. Openings have lots of broad-leaved willowherb, willow and poplar. Closed, dense alder/willow with patchy common horsetail, one-sided wintergreen, etc.
Seasonal Habitat Potential
Spring: L Summer: L Late Summer: L
Bear Travel Concerns – Low. Travel possible on both sides of the river. No real funnel; lots of room to move around.
Visibility Concerns – Moderate. Fairly open but obscured behind campsites; some concern if people wander around.
Other Sensory Concerns – Moderate; some noise from the river; possible wind noise.

Bear Animal Foods – Lots of winter and some recent moose sign.
Bear Sign – Two old northern ground-cone scats. One old track.

AG204 (Field # AGE) – Upstream from Novatak Glacier creek mouth ('Purple Haze #2'?), Glacier Bay National Park

Highest Displacement Concern: **Spring, Summer and Late Summer – Low**
Highest Encounter Concern: **Spring, Summer and Late Summer – Low**
General Description: Large group site but not high use judging by level of impact. We expected much higher use for site called 'Novatak Glacier' in the campsite use reports. Site use may be dispersed like at AG203 (firewood, etc.) and all be given the same name or we have not found it yet. Large cobble fan of glacier runoff channel for substrate with patches of smaller gravel for tents. Patches of broad-leaved willowherb, ground shrub willow, field locoweed, moss ground cover.
Seasonal Habitat Potential
Spring: L Summer: L Late Summer: L
Bear Travel Concerns – Low. Traffic from Novatak has lots of choice; could travel edge of dense shrub. No food to draw bears here. More food on slopes to west.
Visibility Concerns – Low.
Other Sensory Concerns – Moderate. River noise; possible wind.
Bear Animal Foods – Moose scat and one track.
Bear Sign –

AG205 (Field # AGF) – upper Alsek Lake spit, Glacier Bay National Park

Highest Displacement Concern: **Spring and Late Summer – Moderate to High**
Highest Encounter Concern: **Spring and Late Summer – Moderate to High**
General Description: Starting to see large, robust bearroot plants rather than all northern sweet-vetch as seen upstream. Undulating terrain, but only scattered willow with understory of bearroot, ground shrub willow, mountain wormwood, field locoweed, yarrow, etc. Human tracks wandering around all over spit; many upstream for some reason, but most cross over to the lake side of the spit.
Seasonal Habitat Potential
Spring: H Summer: M Late Summer: M-H
Bear Travel Concerns – Moderate. Dead end on peninsula, but bears probably swim the lake; come out to investigate or feed and then travel through.
Visibility Concerns – Moderate. Some open; some obscured.
Other Sensory Concerns – Moderate. River noise; wind.
Bear Animal Foods – Numerous winter moose scats. Small mammal; possibly ground squirrel.
Bear Sign – Three to four fresh digs on way back to camp; bearroot dig at second camp; lots of digs through shrubs all along shore and in back channels - very abundant. Two sand pit beds. Five old tracks; recent female grizzly and coyote tracks. Scats: one old vegetation; one

fresh devil's club/cow-parsnip; one old bearroot/ possible field locoweed flowers; three old bearroot; one old common horsetail.

AG206, subsites a & b (Field # AGGa & b) – Alsek Lake spit, Glacier Bay National Park

Highest Displacement Concern: **Spring and Late Summer – Moderate to High**
Highest Encounter Concern: **Spring and Late Summer – Moderate to High**
General Description: Well-used campsite on middle portion of spit is AG206a. Gord MacRae says he often camps here. Heavy use site at end of spit is AG206b. Several human trails between AG206 a and b. See site AG205 for general notes on the area.
Seasonal Habitat Potential
Spring: H Summer: M Late Summer: M-H
Bear Travel Concerns – High. Spit narrows and bears have no choice to cross river/lake.
Visibility Concerns – Moderate. Undulating terrain; some shrub cover.
Other Sensory Concerns – Moderate. River noise; wind; iceberg.
Bear Animal Foods – Tracks that look like ground squirrel.
Bear Sign – Lots of bearroot digs toward lake behind site AG206a and toward AG205 (see notes for AG205). Large grizzly bear track.

AG207 (Field # AGH) – Gateway Knob, Glacier Bay National Park

Highest Displacement Concern: **Late Summer – Moderate**
Highest Encounter Concern: **Summer and Late Summer – Low to Moderate**
General Description: Large, multi-use group sites. Heaviest use statistics for the two rivers from takeout surveys. Large rock island with channel on right side that is only filled at higher water levels. Lake to west. Steep hillside behind camps.
Seasonal Habitat Potential
Spring: L-M Summer: M Late Summer: M-H
Bear Travel Concerns – Low. Bears probably travel on other side of knob or other shore.
Visibility Concerns – Low. Unless people go back in alders which is unlikely.
Other Sensory Concerns – Low. Unless wind is high; ice flipping and washing sounds; waves on shore.
Bear Animal Foods – One marmot seen; another heard whistling.
Bear Sign –

AG208 (Field #AGI) – Across from Gateway Knob; edge of lake near mouth, RR, Glacier Bay National Park

Highest Displacement Concern: **Spring – Moderate**
Highest Encounter Concern: **Spring – Moderate**
General Description: Large group, infrequent use site on edge of right channel around Gateway Knob near where enter river channel to Dry Bay. Same area we camped in last year, although we had camped a little farther north.
Seasonal Habitat Potential

Spring: H Summer: L-M Late Summer: M
Bear Travel Concerns – Low. Bears cut corner here and seem to hug shrubs; could come along shore, but options to avoid this camp.
Visibility Concerns – Low. Open around campsite.
Other Sensory Concerns – Low. Wind, waves and cracking ice.
Bear Animal Foods – Lots of moose sign: tracks, browsing, summer scat.
Bear Sign – Bearroot digs very abundant along the edge of the medium density alder; northern ground-cone and two old bearroot digs.

AG209 (Field # AGJ) – Alsek Lake dunes area near outlet of lake, RL, Glacier Bay National Park

Highest Displacement Concern: **Summer – Low to Moderate**
Highest Encounter Concern: **Spring and Summer – Low to Moderate**
General Description: Quite high use site, but mostly private groups.
Seasonal Habitat Potential
Spring: L-M Summer: M Late Summer: L
Bear Travel Concerns – Moderate. Traffic in area; easiest out in open site, but can go up next bench or further uphill.
Visibility Concerns – Low. Open site.
Other Sensory Concerns – Low. Possible wind; ice noise.
Bear Animal Foods –
Bear Sign – One large and one small older grizzly bear track; three sets of grizzly bear tracks all over sand.

AG210 (Field # AGK) – Island along Alsek River above Dry Bay pullout, Glacier Bay National Park

Highest Displacement Concern: **Spring, Summer and Late Summer – Low**
Highest Encounter Concern: **Summer – Low to Moderate**
General Description: Hector MacKenzie indicated that he camped on this island. No sign of use, but some potentially on gravel bar on downstream point.
Seasonal Habitat Potential
Spring: L Summer: L-M Late Summer: L
Bear Travel Concerns – Low. Island in channel; bear would have to come here deliberately.
Visibility Concerns – Moderate. Tall alder close by.
Other Sensory Concerns – Moderate. River noise.
Bear Animal Foods – Gulls' eggs and nesting pair of mew gulls.
Bear Sign – Bearroot digs right in camp. One northern ground-cone scat. One old grizzly bear track.

AG211 (Field # AGL) – Dry Bay pullout campsite and airstrip, Glacier Bay National Park

Highest Displacement Concern: **Spring, Summer and Late Summer – Low**

Highest Encounter Concern: **Spring, Summer & Late Summer – Low to Moderate**
General Description: Pullout site for all river trips. Many commercial groups come out on the day they fly out. Private groups frequently camp, however. Constant quad traffic on road through site, especially now during fishing season. Fish plant just down the road and fishermen fishing and leaving nets, etc. on shore. Possibility for food conditioned bear to develop. How is garbage handled? Waste water from fish? guts, etc.? Bear root at ranger station.
Seasonal Habitat Potential
Spring: M Summer: M Late Summer: M
Bear Travel Concerns – Low.
Visibility Concerns – Low.
Other Sensory Concerns – Moderate. Quads, planes; drone in background.
Bear Animal Foods –
Bear Sign – Grizzly bear seen feeding just across the channel on the next gravel bar; some digging - likely bearroot and strawberry. One recent scat and another older one in camp - grass/other vegetation. Lupine roots look like they have been dug and fed upon in three places along the airstrip fringe.

Appendix 3. A proposed bear observation form for use on the Tatshenshini River and Alsek River (adapted from Kluane National Park's *Bear Observation Form*).